



Environment

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July 2016

# Remedial Design Report Off-site Target Area 100% Submittal Norwich Former MGP Site Norwich, New York NYSDEC Site # 7-09-011

## Engineering Certification

I hereby certify that the Remedial Design Report for the Norwich Former Manufactured Gas Plant Site was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the New York State Department of Environmental Conservation Division of Remediation (DER) Technical Guidance for Site Investigation and Remediation (DER10) and that all activities were performed in full accordance with the DER-approved work plan.

Respectfully submitted,  
AECOM Technical Services, Inc.



*Scott Underhill*

07-19-16

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## List of Acronyms

AROD	Amended Record of Decision
bgs	below ground surface
BTEX	Benzene, Toluene, Ethylbenzene and Xylenes
CAMP	Community Air Monitoring Plan
CY	cubic yards
DOT	Department of Transportation
HASP	Health and Safety Plan
LF	linear feet
MGP	Manufactured Gas Plant
NAPL	Non-Aqueous Phase Liquid
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
NYSDOT	New York State Department of Transportation
NYSEG	New York State Electric & Gas Corporation
OSHA	Occupational Safety and Health Act or Administration
PAHs	Polycyclic Aromatic Hydrocarbons
POTW	Publicly Owned Treatment Works
PPE	Personal Protective Equipment
QC	Quality Control
RAWP	Remedial Action Work Plan
REC	Renewable Energy Credit
RI	Remedial Investigation
ROD	Record of Decision
SMP	Site Management Plan
SVOCs	Semi-Volatile Organic Compounds
TAGM	Technical and Administrative Guidance Memorandum

TCLP      Toxicity Characteristic Leachate Procedure

TEP      Technical Execution Plan

VOCs      Volatile Organic Compounds

## 1.0 Introduction

This Remedial Design Report describes the site preparation, in-situ solidification/stabilization (ISS) of off-site target area south of Front Street and site restoration associated with the Norwich Former Manufactured Gas Plant (MGP) site (Site No. 7-09-011) located in Norwich, Chenango County, New York. This measure is an updated approach as required under the Amended Record of Decision (AROD) dated March 2015. This project is being proposed in accordance with Section VII of the Order on Consent (Index Number DO-0002-9309) between New York State Electric & Gas Corporation (NYSEG) and the New York State Department of Environmental Conservation (NYSDEC) the Record of Decision (ROD) for the site dated March 2008 and the Amended ROD March 2015.

The remedial components for the offsite target area of the Site include:

- ISS of the off-site targeted areas south of Front Street as presented in the AROD. ISS will be preceded by pre-excavation to accommodate a portion of the volume expansion of soils during ISS;
- A clean soil cover and demarcation layer constructed in the off-site target area following ISS;
- To the extent practicable green remediation and sustainability will be considered in the design and implementation of the remedy;
- Imposition of an institutional control in the form of an environmental easement; and
- Site Management Plan (SMP) and environmental easements.

This design report includes ISS and soil cover/restoration design details. In-Situ Controls and development of a Site Management Plan, as required in the AROD, will be completed under separate cover. The remedial action will be performed under the approval and oversight of the NYSDEC and the New York State Department of Health (NYSDOH).

### 1.1 Site Location and Description

The NYSEG Norwich Former MGP site (Site) is located at 24 Birdsall Street, in the City of Norwich, Chenango County, New York. The former facility is approximately one acre in area and is bounded to the north by a plaza with retail shops, to the east by a NYSEG substation and private residences, to the south by residential properties, and to the west by the Lackawanna railroad tracks. The former plant is located on Birdsall Street, in Chenango River valley, west of the Chenango River and Rt. 32, south of Rt. 23, and east of Rt. 12.

The Site previously occupied approximately one acre of land located at 24 Birdsall Street. In the years following cessation of gas production, former MGP structures were razed and subsequently NYSEG used the site for equipment storage. Presently, much of the property is paved with asphalt or covered with compacted gravel. A NYSEG electric substation exists on the eastern portion of the site.

The northern part of the Site has been developed as a shopping plaza with retail shops. NYSEG purchased the former Aero Products facility located to the south and used the building for storage for several years. During the summer of 2006, NYSEG demolished the former Aero Products building. The off-site area that extends to the south of the former Aero Products building is comprised of mostly residential housing. NYSEG has purchased property at 37 and 41 Front Street and razed the structures located on these properties to allow for the ISS of the underlying soils.

## 1.2 Site History

The exact starting date of MGP operations at the Site is unknown. However, Sanborn fire insurance maps suggest that the plant operations started sometime between 1863 and 1887. By 1887 the Site began supplying manufactured gas to the City of Norwich under the name "Norwich Gas Lighting Company". Little is known about the generation and disposal practices of residues from the MGP; however, two tar storage vessels existed in the subsurface prior to their removal in 1997. In addition, a potential purifier waste disposal area was identified in 1990 through an interview with a former employee of the MGP.

Manufactured gas was produced at the Site using the coal gasification and carbureted water gas processes. In 1892 the name of the facility operator was changed to "Norwich Illuminating Company," which was later changed to "Norwich Gas and Electric Company" in 1917. Coal gas was produced on site until 1917 and then carbureted water gas was produced from 1917 to 1953. NYSEG acquired the property in 1939.

## 1.3 Previous Investigations and Remedial Actions

The following provides a brief chronology of the remedial history at the Site to date:

- 1990 – A Task I investigation was conducted by Engineering-Science, Inc. Seven subsurface samples were collected and analyzed by NUS Corporation, under contract to the United State Environmental Protection Agency (USEPA).
- July 1992 – A Task II Investigation Report determined that benzene, ethylbenzene, toluene, and xylenes (BTEX) and polycyclic aromatic hydrocarbons (PAHs) were present in on-site subsurface soils and that the most highly contaminated soils occurred at depths from one to six feet below ground surface downgradient of the former relief holder and distribution holder, the tar well, and former above ground oil tanks.
- March 1994 – The NYSDEC and NYSEG entered into a multi-site Order on Consent (#D0-0002-9309), which obligates NYSEG, the responsible party, to implement a full remedial program at 33 former MGP sites across the state, including the Norwich site.
- July 1997 – A Task III Investigation was performed to assess the potential presence of surface soil, subsurface soils, and groundwater contamination on Site and in backyards adjoining the Site and to determine the location and size of the former tar well and relief holder.
- 1997 – An Interim Remedial Measure (IRM) was performed by NYSEG to remove MGP residues from source areas at the Site to achieve a site-wide cleanup goal of 0.1 parts per million (ppm) for benzene and 500 ppm for total PAHs. Approximately 11,500 tons of soil was excavated and disposed off-site during the IRM. Of this material approximately 6,800 tons were considered source materials. Underground structures and piping associated with the former MGP were removed during the IRM. An air sparging and soil vapor extraction (AS/SVE) system was installed at this time to address the groundwater contamination.
- December 1999-January 2000 – The AS/SVE system started operation.
- June 2003 – The AS/SVE system was decommissioned after evaluations indicated that it was no longer effective.
- October 2006 – A Remedial Investigation (RI) was completed (ISH, Inc., 2006). Numerous soil borings, piezometers, and monitoring wells were installed during the RI for analysis of soils, groundwater, and hydrogeologic conditions.
- November 2007 – A Final Feasibility Study (FS) was prepared to evaluate remedial alternatives for the Norwich Former MGP site (Ish, 2007).
- March 2008 – The NYSDEC issued a ROD for the NYSEG Norwich Former MGP Site. The ROD presents the selected remedy for the site (NYSDEC, 2008).

- October 2010 to June 2011 – NYSEG completed ISS remediation of the on-site area, and the off-site properties at 37 and 41 Front Street. A Construction Certification Report (CCR) was submitted by AECOM at the completion of this work (AECOM, 2012).

All of the documents associated with these Investigation and Reports are available for public review at the following document repositories:

New York State Department of Environmental Conservation Attn: Ms, Sarah Saucier  
625 Broadway  
Albany, NY 12233  
sarah.saucier@dec.ny.gov  
518-402-9662,

## 2.0 Remedial Action Objectives

The primary objectives of the remedial action, as required by the ROD issued March 2008 and the AROD issued March 2015, include:

- Remediate, to the extent practicable, areas containing source material;
- Eliminate potential exposure to source material;
- Control future migration of source material from on-site to off-site areas;
- Eliminate potential human exposure to subsurface soil containing MGP-related contamination; and
- Eliminate potential human exposure to groundwater containing MGP-related contamination.

Further, the remediation goals for the Site include attaining to the extent practicable:

- Ambient groundwater quality standards.

### 3.0 Organizational Structure and Responsibility

NYSEG and New York State regulatory agencies will participate jointly in this remedial action associated with the Norwich former MGP site. NYSEG has the ultimate responsibility for implementing the remedial action for the project, including the community air-monitoring program during construction (see Organization Structure in Appendix A). Approval of this Remedial Design Report by the NYSDEC and the NYSDOH will be secured prior to intrusive activities and site excavation. The NYSDEC and the NYSDOH personnel are anticipated to be on site periodically for purposes of general program oversight. The remediation contractor will be responsible for all on-site construction operations during the project, unless otherwise stated in Section 4.0, including: excavation safety and protection of adjacent structures and utilities; construction personnel health and safety; implementation of contingency plans for odor control; management of wastewater and waste-handling operations; maintenance of site controls (i.e., run-off, run-on); the construction, excavation, and material handling activities associated with the remedial action; the soil sampling program associated with the remedial action; and documentation of the extent of the removal action. NYSEG will be responsible for implementing the community air monitoring plan (CAMP).

Communication with regulatory agencies and with members of the surrounding community will be managed by NYSEG.

Key personnel and their assigned responsibilities for implementation of the remedial action include:

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**NYSDEC:** New York State Department of Environmental Conservation Attn: Ms, Sarah Saucier  
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[bee@health.ny.gov](mailto:bee@health.ny.gov)  
518-402-7860



## 4.0 Remedial Design

### 4.1 Introduction

This Remedial Design includes a chronological description and performance schedule of anticipated project activities for the Norwich site associated with the offsite target area of the remediation. Documents include design drawings, ISS specifications, a citizen participation plan, an ISS stabilization bench-scale study with construction quality control testing results from onsite remedial activities performed in 2010/2011, a Construction Quality Assurance Plan (CQAP), a Quality Assurance Project Plan (QAPP), a transportation of solid and/or liquid waste plan, a project schedule, an organizational structure, a vapor emission response plan, a Contingency Plan (CP), a CAMP, an Erosion and Sediment Control Plan, and a NYSDEC Remedial Design Report approval letter.

Actual project data (e.g., community air-monitoring, noise, dust control) obtained from NYSEG's previous remediation efforts at this and other MGP sites have been used as guidance to design the procedures for the Norwich site remediation project.

All work will be conducted to minimize public impact (e.g., traffic, parking, noise) to the extent practicable. Construction operations will generally not begin prior to 7 a.m. or continue after 7 p.m., Monday through Friday. Work on weekends will only be undertaken as necessary to meet the project completion schedule. The following sections describe the procedures to be used for remedial activities.

### 4.2 Summary of Pre-Remediation Activities

The primary pre-remediation activities covered under this remedial design include:

- Assisting NYSDEC in preparation of a citizen participation notice and fact sheet
- Obtaining regulatory permits
- Preparation of pre-mobilization submittals

### 4.3 Summary of Remediation Activities

The primary activities covered under this remedial design include:

- Mobilization and site preparation;
- Community air monitoring;
- Pre-excavation and proper management of soils below existing ground surface to accommodate the generation of spoils during ISS processes;
- ISS of the impacted soils by auger mixing;
- Management, transportation, and disposal of excess ISS spoils to an off-site permitted facility;
- ISS confirmation sampling and testing to document compliance with design goals;
- A clean soil cover and demarcation layer will be constructed in the off-site ISS area. The soil cover will be a minimum 48 inches thick. Areas intended to be vegetated will receive six inches of top-soil that is suitable to establish vegetation. Areas not intended to be vegetated will receive six inches of compacted gravel or asphalt cover (where necessary); and
- Surveying and site restoration.

The remainder of this section describes these activities and provides the information used as the basis for the design. Specific instructions to the ISS contractor are provided in the Specifications and Drawings.

#### **4.4 Site Preparation**

The Contractor will prepare the site for the required excavation work. The site preparation activities include:

- Mobilization;
- Surveying to establish baseline conditions and grades;
- Installation of security fencing;
- Installation of erosion and sedimentation controls;
- Set-up of temporary site facilities;
- Utility location, protection, and relocation;
- Set-up of traffic management at the project site.
- Set-up and preliminary background study of CAMP stations;
- Operation of CAMP stations during construction activities. Additionally these CAMP stations should be operated prior to remedial excavations and ISS activities to determine background concentrations.

##### **4.4.1 Mobilization**

The Contractor will mobilize to the site all necessary manpower, equipment, and materials to initiate the work. The initial mobilization will include the delivery of the materials and equipment for site preparation. This will be followed by delivery of equipment and materials needed for excavation work. Erosion and sediment controls, including silt fences, will be installed prior to any disruption of site soil. The erosion and sediment controls will be maintained throughout the duration of the work. Erosion and sediment controls are further described in Section 4.8.3.

##### **4.4.2 Erosion and Sedimentation Controls**

Prior to clearing any vegetation or disturbing any site soils, siltation fence and/or hay bales will be placed around any affected catch basins. During construction, all areas of disturbance shall have silt fence and/or hay bales to control erosion and sedimentation around their entire perimeter. Engineer may direct the Contractor to install additional erosion and sedimentation controls for surface water runoff (i.e. hay bales and/or earth berms) during construction. The integrity of the siltation fence and earth berm shall be checked daily. Silt fences should be installed adjacent to hay bales closest to the remediation activities. During all portions of the construction erosion and sediment controls shall be maintained in accordance with the *Erosion and Sediment Control Plan* (Appendix K). Erosion and sediment controls are further described in Section 4.8.3

##### **4.4.3 Clearing and Placement of Site Facilities**

The Contractor will establish the site facilities necessary to support and execute the work. Fencing, trees, and other surface features that impede access to the excavation area will be removed. The following site facilities may be required during remedial construction:

- Construction offices;
- Utilities (electric, water, sewer, and telephone);
- Lighting;

- Security fencing (meeting NYSEG Substation Yard and Technical Specifications);
- Fuel storage and dispensing;
- Sanitary facilities;
- Haul roads;
- Decontamination pad(s);
- Health and safety equipment;
- Material laydown areas;
- Soil stockpile areas;
- Traffic control signage; and,
- Parking areas.

Site fencing will have professionally-made signs stating that access to the site is limited to authorized personnel and work within the site must be done with the appropriate personal protective equipment (PPE). In addition, a 4 by 8 foot sign will be posted reading "NYSDEC Order of Consent No. DO-0002-9309" in compliance with the NYSDEC specifications. A hotline will be set up which will provide the public with means of contacting NYSEG or its representatives to express concerns about the project, including odor- and dust-related issues. The site hotline number will be identified on temporary signs mounted on the perimeter fencing surrounding the Site.

Work zones will be established within the site boundaries in accordance with the Contractor's site-specific Health and Safety Plan (HASP) and the drawings that define the initial exclusion zones, the decontamination zones, and the support zone. These zones will change as the work progresses in order to maintain safety and allow for practical completion of the work.

#### **4.4.4 Surveying**

The Contractor will retain a New York State-licensed surveyor to provide initial benchmarks and stakeout for horizontal and vertical excavation. The Contractor will use this initial survey to confirm and maintain horizontal and vertical limits as the work proceeds. The licensed surveyor will return to the site as needed to document measurements of unit cost bid items, excavation volumes, and to complete an as-built survey of the finished work.

#### **4.4.5 Protection of Utilities**

The Contractor will provide utility clearance for all work at the site. The drawings identify known utilities that are active in the work areas and that must be protected.

#### **4.4.6 Utility Relocation**

No utility relocation is currently planned to complete the ISS of the off-site area south of Front Street. However the New York Susquahanna and Western Railway (NYS&W) track control overhead wiring is scheduled to be removed prior to beginning excavation work. In addition, the switch control shed will be temporarily removed prior to the start of remediation and will be restored in kind subject to the requirements of the NYS&W. Lastly, an underground service wire will be installed to replace the removed overhead wiring. The underground service wire will be installed within a two foot by two foot excavation area alongside the railway. The design drawings provide additional detail on this work.

#### **4.4.7 Decommissioning of Monitoring Wells**

Monitoring wells identified in the drawings that will be damaged during the remedy implementation will be removed in their entirety or abandoned during the site preparation activities per NYSDEC commissioner policy CP-43 – Groundwater Monitoring Well Decommissioning Policy (NYSDEC, 2009b).

#### **4.4.8 Traffic Management**

A transportation route will be submitted by the Contractor that describes the specific off-site transportation routes that will be followed to manage construction traffic during the work and in a manner that minimizes disturbance to the community. The transportation route shall be approved by NYSEG prior to mobilization. Temporary closure of Front Street will be necessary to complete remediation activities. NYSEG shall coordinate closure with the City of Norwich as necessary.

### **4.5 Excavation**

#### **4.5.1 Excavation Objectives**

Excavation of shallow soils and subsurface obstructions will be conducted prior to starting the ISS work. The objectives of this excavation are to:

- Clear the area of readily removable obstructions in preparation for ISS;
- Clear shallow obstructions to permit ISS; and
- Create room for and manage spoils and expansion of solidified material (a swell volume of 25% is anticipated).

#### **4.5.2 Limits of Excavation**

The vertical limit of excavation will be to the elevation shown in the design drawings (approximately five feet below existing ground surface contours). The design provides for excavation of obstructions below the water table to the extent that it does not require dewatering or shoring and that sidewall stability can be safely maintained. Excavation to clear deep obstructions will be conducted as needed to allow advancement of ISS augurs.

Pre-ISS excavation will be to a depth of 5 feet bgs instead of 7 feet bgs, as described in the AROD. This alteration is being made in order to prevent excavating below the water table during pre-ISS excavation activities. Limiting pre-ISS excavation activities to depths above the water table provides a working surface more suitable for the equipment and machinery that will be used to perform ISS.

The horizontal limits of excavation are shown in the design drawings. The defined horizontal limits have been defined in accordance with the AROD and the anticipated structural/geotechnical and practical constraints of the work area. The off-site ISS area has a footprint of approximately 14,450 square feet. The Pre-ISS Excavation Area has a footprint of 17,264 square feet. A total of approximately 3,197 cubic yards (CY) of material is anticipated to be removed during the pre-excavation. The offsite target area is part of the NYS&W right-of-way. Part of the NYS&W infrastructure currently on the ISS Area is a switch control shed and associated overhead wiring. As part of the preparation for the remediation these components will be removed.

Little to no MGP impacts have been documented at depths less than 10 feet below ground surface. Excavated materials below the site cleanup criteria set forth by the AROD (i.e., 500 mg/Kg of PAHs; 10 mg/Kg of BTEX) and not visually identified to contain NAPL may be transported across Front Street to the soil staging area on-site, stockpiled, and evaluated for reuse on the Site in accordance with the QAPP. All stockpiled soils will be covered with poly sheeting and protected with soil erosion and dust controls as

needed and as described in Sections 4.8.1 and 4.8.3. Impacted soils will be staged in lined and bermed areas to contain runoff and dewatered fluids.

### **4.5.3 Excavation Sidewall Stability**

Slopes shall comply with Occupational Safety and Health Administration (OSHA) requirements (29 CFR 1926.650 to 1926.652). The contractor will be responsible for providing support to all utilities, structures, etc., as needed to complete the work.

## **4.6 In-Situ Solidification**

The contractor will conduct ISS in accordance with the design drawings and the technical specification In-Situ Solidification – Auger Mixed. This section presents the basis for the ISS design, including consideration of the horizontal and vertical limits and groundwater modeling and drainage design.

### **4.6.1 Horizontal Limits of ISS**

The horizontal limits of ISS are shown in the drawings, in accordance with the AROD. The off-site area has a footprint of approximately 14,450 square feet.

### **4.6.2 Vertical Limits of ISS**

The augered ISS will extend vertically into the silt/clay layer (up to 34 feet bgs). Subsurface drilling for investigation and the installation of NAPL recovery wells has been completed in and around the offsite target area between 2005 and 2011. From these field observations the average maximum depth of impacts is approximately 26 feet bgs. In certain isolated areas the maximum depth of impact is up to 34 feet bgs. The design drawings provide the estimated depths within the ISS area. It is anticipated that the augered ISS will extend to the required installation depth of two feet (four feet for perimeter columns) into the clay barrier layer over the entire footprint of the column.

### **4.6.3 ISS by Auger Mixing**

Soil will be solidified using an auger mixing rig in an overlapping sequence so that a monolithic solidified mass is created within the horizontal and vertical limits of ISS as shown on the design drawings. The auger size is anticipated to be 10 feet in diameter. However, the Contractor is responsible for auger sizing to install ISS treatment to full required depth. Quality Control (QC) testing of the solidified material will be conducted to confirm that it meets the performance criteria. Samples will be collected and tested for the performance criteria for every 500 cubic yards of material solidified or once per day, whichever is more frequent. Additional samples will be collected at the discretion of the Engineer. The Contractor will recover all mixed soil samples at the direction of the Engineer. The Contractor will form the sample cylinders and submit them for analysis. Extra sample cylinders will be formed at each sample location should repeat testing be necessary.

The bench-scale tests and original ISS work QC data provide a series of mixes that are anticipated to meet the project performance requirements. However, each contractor shall submit their proposed mix design during the bidding process. The Contractor will be required to demonstrate their mixture meets performance criteria on site soils prior to being selected. The Contractor is responsible for meeting the project's performance requirements. The performance criteria for the solidified material include:

- Unconfined compressive strength greater than 50 pounds per square inch (psi) after 28 days of curing by ASTM D 1633-00 — Standard Test Method for Compressive Strength of Molded Soil Cement Cylinders;
- Hydraulic conductivity less than  $1 \times 10^{-6}$  centimeters per second (cm/sec) after 28 days of curing by ASTM D 5084-00 — Standard Test Methods for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter.; and

- Visual verification of continuity of ISS treatment in accordance with NYSDEC Standards.

#### **4.6.4 ISS Expansion**

ISS expansion is expected to be approximately 15 – 30% by volume. During previous Site activities, an actual expansion percentage of approximately 25% was documented. Following ISS, the contractor will grade the top of the ISS monolith to provide the required clean cover as shown on the drawings. Additional ISS spoils will need to be transported off site for appropriate disposal, as described in the Specifications.

#### **4.6.5 ISS Monolith Stability**

The solidified material should form a stable monolith across the site. Experience at other sites indicates the unit weight of the solidified soil is similar or slightly higher than the existing soil. Therefore, loading from the increased weight of the solidified monolith to the underlying soils would be small and would result in a negligible load increase on the underlying soils.

## 4.7 Waste Management

Six potential waste streams have been identified that may be generated during the remedial action:

1. Impacted (non-hazardous, but exceeding 500 mg/Kg total PAHs, 10 mg/Kg BTEX, and/or containing visible NAPL) soil excavated from the pre-excavation activities;
2. Non-impacted (below 500 mg/Kg total PAHs, 10 mg/Kg BTEX, and not containing visible NAPL) soil excavated from the pre-excavation activities;
3. Excess solidified soil resulting from volume expansion during ISS;
4. Contaminated debris;
5. Non-contaminated debris; and
6. Pre-treated wastewater.

All of the material that is excavated will be sent off-site for disposal (i.e., soils containing visible coal tar or oil) or stockpiled onsite for reuse. Excavated material to be sent off-site will be sent to an off-site disposal facility permitted to accept the waste and approved by NYSEG.

Waste Management details are further described in Specification 02120 — Off-site Transportation and Disposal, and the Drawings.

### 4.7.1 On-site Waste Management

Because of construction sequencing, off-site disposal facility scheduling issues, and in order to consolidate large amounts of waste material for bulk truck shipments, storing impacted material on site prior to loading and shipment may be necessary. To the extent possible, impacted material generated during excavation will be loaded directly into trucks for off-site transportation. To the extent practicable stockpile areas will be located over areas to be excavated, negating the need for liners. However, berm and leachate control is still required. The use of liners, berms and leachate controls will be determined by the Engineer based on whether the material underlying the stockpile area will eventually be excavated. Odors leaving the work area are unacceptable. If any odors are detected offsite, operations at the site will be suspended until odor issues are resolved. On-site storage will take place in accordance with all laws and regulations dealing with the type of waste being stored. Liquid wastes will be stored in appropriate tanks or drums. Other (non-soil) solid materials will be stored in roll-off containers or covered stockpiles.

Debris generated during demolition and excavation may require decontamination to meet facility acceptance requirements. Decontamination will take place using brushes, steam cleaners, and/or pressure washers. Residues from decontamination operations will be collected and managed with other contaminated soil. Decontamination water will be collected for on-site treatment or off-site disposal or treatment.

Soils not meeting TCLP requirements will be shipped to a thermal facility permitted to accept such soils under the New York State conditional exclusion for soils exhibiting the toxicity characteristic for benzene (DO 18). If the soils are shipped out of state, the handling and disposal of the soil will be in compliance with the regulations of the receiving state.

All waste management activities, including handling and loading, will be done in such a manner that odors and vapors are controlled, in accordance with the Community Air Monitoring Plan (CAMP), provided in Appendix B.

Street sweeping will be performed by the Contractor on public roadways as required.

#### **4.7.2 Waste Characterization**

The soils to be excavated will be characterized for disposal in accordance with the QAPP during the remedial action by the Engineer. This waste characterization data will be used to facilitate the profiling and acceptance of the materials by the intended disposal facility. The Engineer will provide relevant data to the Contractor and the selected disposal facilities.

#### **4.7.3 Off-site Transportation**

The Contractor will load, transport, stockpile, and dispose of the excavated material. Waste materials will be transported in dump or tanker trucks to the receiving disposal facilities. Transportation of impacted materials from the site will be performed in accordance with all hazardous waste, non-hazardous waste, and transportation regulatory requirements.

All haul trucks will have poly bed liners, tarp covers, and gasketed tailgates. Trucks will be sprayed, as necessary, with odor suppressive foam prior to covering to reduce vapor and odor emissions.

Trucks will be loaded in such a way as to avoid contamination of their exteriors including tires. All trucks will be thoroughly inspected for contamination prior to leaving the site. In the case when truck exteriors do become contaminated they will be decontaminated prior to leaving the site.

Hazardous waste shipments will be documented using standard hazardous waste manifests as required by applicable hazardous waste regulations. Other waste materials that have no specific documentation requirements will be documented using waste tracking forms, bills of lading, and receipts. All shipments of waste from the site will be documented, at a minimum, to describe the type and amount of waste and the receiving facility. NYSEG designated representative will sign the transportation manifests prior to loads leaving the site. Off-site trucking will follow the haul route shown in Appendix D – Transportation and Solid and/or Liquid Material. .

#### **4.7.4 Off-site Disposal or Treatment**

All excavated materials will be transported to an off-site disposal facilities permitted to accept such waste and approved by NYSEG:

#### **4.7.5 Water Management**

Water containing MGP constituents will be generated, collected, and contained during decontamination of debris and equipment. The volume of collected impacted water is expected to be minimal as excavation will take place primarily above the groundwater elevation. The use of proper run-on and run-off controls will further limit the amount of impacted water to be collected.

Collected water will be sent to an approved off-site disposal facility.

#### **4.7.6 Site Restoration**

Following all remedial activities, the affected areas will be backfilled to finish grade with clean fill as shown on the Drawings. All disturbed areas will be restored to the pre-existing conditions. Disturbed roadways, walkways, and other public areas shall be restored in accordance with City specifications as indicated in the Drawings.



## **4.8 Environmental Monitoring and Controls**

The Contractor will provide environmental controls to ensure that the work activities do not spread impacted soil and MGP wastes outside the impacted areas and maintain the protection of human health and the environment throughout the project.

### **4.8.1 Odor, Vapor, Dust, and Noise Control**

A variety of engineering controls will be available to control odors, vapors, and dust. Those controls will include, but will not necessarily be limited to, wetting soils with water to control dust, limiting the size of excavations, covering contaminated soils with plastic sheeting or foam, and spraying soils with Biosolve™. An adequate supply of odor suppressing foam and a foam applicator will be available onsite at all times when excavation activities are taking place. In addition, site reagents (e.g., cement and bentonite) shall be properly transported and operated to eliminate any dust release associated with material delivery and site use. The Contractor shall provide in the Remedial Action Work Plan (RAWP) detailed descriptions and drawings with the means and methods proposed for controlling and monitoring odors and vapors during the work. All odor and vapor control equipment and materials shall be approved by the Engineer prior to use.

Air Monitoring will be performed in accordance with the CAMP. The work will be stopped, in a controlled stand-down procedure, if acceptable levels of air impacts are exceeded or chronic odors exist. The work stoppage will continue until the source of the emissions is found and the appropriate mitigation efforts are in place. Engineering controls will be applied, as needed, based upon site conditions and the results of air monitoring activities.

Care will also be exercised to mitigate noise impacts during the project activities. Work hours will be limited to routine daytime hours (7 a.m. – 5 p.m.) and equipment will be maintained in proper working order. Where possible, shrouding and/or sound dampening measures will be utilized to minimize noise. All City ordinances and requirements regarding noise will be followed.

### **4.8.2 Air Monitoring**

Site perimeter and work zone air monitoring will be conducted in accordance with Section 5, the site HASP, QAPP, and CAMP. Emergency response measures associated with air monitoring are presented in the site HASP, Vapor Emission Responses Plan, and Section 5.

Summaries of all air monitoring data will be provided to the appropriate parties' regulatory agencies on a weekly basis to facilitate the transfer of information related to potential health risks. The NYSDOH project manager must be notified of any exceedance as soon as possible after the event.

### **4.8.3 Erosion and Sediment Control**

Erosion will be prevented and sediment will be controlled during all on-site activities in accordance with the applicable New York State guidance. Storm water run-off will be controlled in a manner to prevent contact with impacted soils. Any storm water that does contact impacted soils will be collected, and transported off-site as discussed in Section 4.7.5. Hay bales, silt fence, stone, and/or rip rap will be used as necessary to prevent erosion of exposed soils. The erosion control structures will be inspected a minimum of once per week and after significant rainfall events, greater than ½ inch per day. Additional erosion control materials will be kept on site to immediately repair any deficiencies that are discovered during the inspections. A Storm Water Pollution Prevention Plan shall be prepared by the Contractor and submitted to the Engineer for review prior to beginning intrusive work on-site.

## 5.0 Documentation of Site Activities

### 5.1 Daily Field Construction Report

A daily field construction report will be prepared by the NYSEG project coordinator to document daily on-site activities. The Daily Field Construction Report will be submitted at the end of each week in an electronic format to Mr. Tracy Blazicek, NYSEG project manager at [tlblazicek@nyseg.com](mailto:tlblazicek@nyseg.com).

### 5.2 Transportation Log

A transportation log will be prepared by NYSEG project coordinator to document all loads of solid or liquid waste that are transported off-site. The Transportation Log will be submitted at the end of each week in an electronic format to Mr. Tracy Blazicek, NYSEG project manager at [tlblazicek@nyseg.com](mailto:tlblazicek@nyseg.com).

### 5.3 Weekly Community Air-monitoring Report

A weekly community air-monitoring report will be prepared by NYSEG sampling technician to document daily air-monitoring results. The weekly community air-monitoring report will be submitted at the end of each week in an electronic format to Ms. Melissa Doroski, NYSDOH at [bee@health.ny.gov](mailto:bee@health.ny.gov), Ms. Sarah Saucier, NYSDEC at [sarah.saucier@dec.ny.gov](mailto:sarah.saucier@dec.ny.gov), and Mr. Tracy Blazicek, NYSEG project manager at [tlblazicek@nyseg.com](mailto:tlblazicek@nyseg.com).

### 5.4 Master Sample Log

A laboratory notebook will remain in the field office to record every sample collected. The sampling technician will log in all samples collected and those sent to the off-site analytical laboratory. Waybill numbers will be logged at the end of each day.

### 5.5 Chain of Custody

A Chain-of-Custody form will document custody of all samples from the field to the laboratory.

### 5.6 Waybills

A waybill receipt will be obtained at the time of accepted sample shipment by Federal Express or courier and will be attached to the Master Sample Log.

### 5.7 NYSEG's Public Liability Accident Report, NYSEG's Report of Employee Injury, and NYSEG's Incident Report

The above-mentioned report forms will be used to document any accident occurring on-site during the remedial project. The sheets are attached to the *Health and Safety Plan* and will be located in the field project trailer.

## 6.0 Permitting and Regulatory Requirements

### 6.1 Permitting

In addition to performance requirements established to ensure that the design of the remedial action meets the remedial action objectives set in the ROD (NYSDEC, 2011) and AROD (NYSDEC, 2015), the design will also be prepared to meet permitting and other regulatory requirements of the local, state, and federal laws and regulations. As specified in Appendix 7B of the DER-10 Technical Guidance for Site Investigation and Remediation (NYSDEC, May 2010), the NYSDEC may grant exemption from most state permits required for completion of this remedial action, provided the substantive requirements of the permit programs are followed. The Contractor will be required to determine whether a required permit may be granted an exemption prior to beginning work.

### 6.2 Regulatory Requirements

Environmental regulations regarding hazardous and non-hazardous waste management apply to this work and will be implemented accordingly. These include provisions for the containment and cleanup of spills and other standard provisions that may be included in this work.

Regulations promulgated by OSHA specify safety and health requirements for work procedures at all work places and specifically at construction sites and hazardous waste sites.

Industry standards for work at hazardous waste sites presented in 29 CFR 1910.120 describe specific requirements, including the following:

- Preparation of a project HASP;
- Training and medical monitoring of personnel who may be exposed to hazardous substances; and,
- Air monitoring, respiratory protection, and PPE.

Procedures outlined in the HASP include daily health and safety review meetings, proper use of safety equipment, proper mechanical equipment use, and other policies. At a minimum, the PPE to be worn on site will include safety glasses, hard hat, and steel-toed shoes or boots.

The subjects to be covered in the HASP, at a minimum, include:

- Health & Safety Risk Analysis;
- PPE;
- OSHA Air Monitoring & Action Levels;
- Site Control;
- Decontamination;
- Emergency Response Plan;
- Lockout/Tagout;
- Heavy Equipment Operations;
- Excavation and Trenching;

- Material Safety Data Sheets; and,
- Health and Safety Records and Reports.

The Contractor shall prepare a Site HASP as a bid submittal. The Contractor's HASP will be subject to the Engineer's review and NYSEG's approval. The Contractor shall follow the requirements of their own HASP throughout the work.

Prior to the work, the selected Contractor will provide to the Engineer written evidence of the following items for each person who will be entering the work zone:

- Date of respirator fit test;
- Date of OSHA 40 hour training (or 8 hour refresher training); and
- Date of annual physical.

Persons without these items, both up-to-date and on file with the Engineer will not be allowed to enter the work zone.

### **6.3 Transportation Requirements**

The federal Department of Transportation (DOT) has developed requirements which regulate the transportation of hazardous materials by road and rail. Among the hazardous materials identified in these regulations are coal tar distillates. In addition, as discussed above, hazardous waste regulations specify that shipments of hazardous wastes must meet certain requirements presented in the federal and applicable state regulations.

Specific requirements for hazardous material shipments include the following:

- All truckers must have valid 364 Waste Transporter Permits;
- Shipping papers must include a description of hazardous materials included in the shipment along with the DOT designated identification number and hazard class. Hazardous wastes may not be shipped without a manifest (49 CFR 172.200);
- Each container, package, or vehicle containing a hazardous material must be marked or labeled with the DOT shipping name, technical name, identification number, and hazard class (49 CFR 172.300 and .400);
- Each vehicle or container containing a hazardous material must be appropriately placarded (49 CFR 172.500);
- When hazardous materials are transported, emergency response information must be available at the point of loading, unloading, and during transport; and,
- Truck routes to and from the site will comply with Appendix D – Transportation of Solid and/or Liquid Material.

## 7.0 Quality Assurance

Quality assurance procedures will be implemented during the work to ensure that it is in conformance with the Remedial Design, and to provide the basis for implementation of contingency actions, if necessary, to bring the work into conformance with the Remedial Design. Additional quality assurance measures are detailed in the Construction Quality Assurance Plan (CQAP) (Appendix E).

### 7.1 General Quality Assurance Procedures

The following quality assurance procedures and tests will be implemented as required under DER\_10 (NYSDEC, 2010):

- Submittal, by the Contractor, of weigh tickets for all earthen materials transported to or from the site;
- Submittal, by the Contractor prior to the work, of sieve analyses for all imported earthen materials;
- Evaluation by the Engineer of the Contractor's proposed borrow source(s) for imported earthen materials. The Contractor will provide to the Engineer analytical data indicating that imported material meets the requirements of DER-10;
- Surveying of the work limits as described in Section 4.4.4;
- Field verification by the Engineer of excavation, ISS treatment, and placed material depths, areas, and volumes; and
- Field observations and QA/QC sampling by the Engineer of ISS treatment as described in Section 4.6.3.

### 7.2 ISS Quality Assurance

The Contractor will provide a specific ISS mix design with identification of the reagents and their sources. The primary means of quality assurance/quality control during the ISS process will be the observations of the ongoing process by the field construction manager. Samples will be collected and tested for the performance criteria as presented in Section 4.6 and the specifications Solidified material that does not meet the performance criteria will be reprocessed until the performance criteria are met. The Contractor is responsible for meeting the project's performance requirements. ISS quality assurance procedures and performance requirements are described in the specifications.

### 7.3 Contingency Plan

In the event of a site emergency such as a spill, power loss, severe weather, fire, structural collapse, or other life-threatening incident not specifically addressed in the site HASP, the employees on scene should immediately check the scene, evacuate if life threatening, call 911, and give care as appropriate within the scope of their training. The site specific Contingency Plan is included in Appendix G.

## 8.0 Project Reporting

During the course of the work, the Contractor will regularly provide to the Engineer:

- Daily field logs;
- ISS Mix Reports;
- Equipment and material testing records; and
- Weigh tickets.

At the conclusion of each workday, the Contractor and the Engineer will review the work completed and reach agreement on the quantities for payment obtained from the previous day.

During the course of the work, weekly progress meetings will be conducted with attendance by NYSDEC and NYSDOH, if needed.

The Engineer will provide weekly Progress Reports to NYSEG and NYSDEC. Progress Reports will include:

- The previous week's actions;
- Next week's planned actions;
- Sampling and analytical results;
- Design changes and other modifications to the design; and
- Revised project schedules.

Within 90 days of completion of the remedial activities, the Engineer will prepare a Construction Completion Report (CCR) for the offsite target area of the remedy, approved by a professional engineer licensed in the State of New York.

The following items will be included in the CCR, as required by DER-10:

- A description of all field work performed;
- As-built drawings;
- Identification of all changes to the Remedial Design;
- Copies of all pertinent analytical results, testing records, weigh tickets, bills of lading, and manifests from the disposal of materials;
- A discussion of green and sustainable practices implemented during remediation activities; and
- Engineer's certification.

## 9.0 Green Remediation

The work completed as part of this work plan will comply with all NYSDEC guidance documents including DER-31: Green Remediation (NYSDEC 2011). To ensure compliance with DER-31 the work will be completed using the best practices and techniques described below. In addition to the items discussed in Section 8.0 – Project Reporting specific reporting methods relative to DER-31 are further described below.

### 9.1 Best Practices and Techniques

DER-31 provides some examples of best practices and techniques that could be applied during all phases of remediation (Attachment 1 of the DER-31 policy). In addition, NYSDEC expects that the techniques identified below will be implemented at sites unless a site-specific evaluation demonstrates impracticability or favors an alternative green approach:

Practice/Technique	Potential Benefits <sup>1</sup>	Applicable to this Work Plan
Use renewable energy where possible or purchase Renewable Energy Credits (RECs)	Reduce/supplement purchased energy use	
Use of remediation technologies with an intermittent energy supply (i.e., energy use during peak energy generation only)	Reduce energy use	
Incorporate green building design	Reduce future use impacts	
Reuse existing buildings and infrastructure to reduce waste	Reduce waste and material use	
Reuse and Recycle construction and demolition (C&D) debris and other materials (i.e., grind waste wood and other organics for on-site use)	Reduce waste and material use	X
Design cover systems to be usable (i.e., habitat or recreation)	Reduce construction impacts of future development	X
Reduce vehicle idling	Reduce air emissions and fuel use	X
Use of alternate fuels (i.e., biodiesel or E85)	Reduce air emissions	X
Sequence work to minimize double-handling of materials	Reduce construction impacts	X
Use energy efficient systems and office equipment in the job trailer	Reduce energy use	X
<sup>1</sup> Potential benefits listed are not all inclusive and will vary dependent upon the site and implementation of the practice or technique.		

In order to comply with the requirements of DER-31 the following actions will be taken:

- All vehicles and fuel consuming equipment onsite will be shut off if not in use for more than 5 minutes;
- All electricity use associated with the site (i.e., site trailer) will be minimal and, therefore, RECs will not be purchased to offset that electricity use following construction completion or at the end of each calendar year, whichever comes first;
- Work will be sequenced, to the extent practicable, to allow the direct loading of waste containers for off-site disposal;
- To the extent practicable, energy efficient systems and office equipment will be utilized within the site trailers;
- Where practicable non-impacted excavated soil and construction debris that has been segregated from impacted materials will be reused onsite during backfill and site restoration activities; and,
- All vehicles and equipment that consume diesel fuel will be required to use ULSD.

## 9.2 Reporting

All green and sustainable practices and techniques employed each day will be discussed within the daily reports described in Section 5.1 – Daily Reporting. Specifically, the report will acknowledge that the five actions described above were taken that day (if applicable). In addition, the following information will be provided within the daily report:

- The estimated quantity of fuel consumed by onsite vehicles and equipment;
- The estimated distance traveled by trucks and equipment delivering goods or removing waste; and,
- The estimated water use during onsite activities.

The information collected will be presented within the construction completion report with a discussion of the estimated environmental impact associated with the information.



## **10.0        Schedule and Hours of Operation**

The remedial activities are planned to begin in Late fall 2017 and be substantially completed by the end of fall 2018. Weather-dependant site restoration activities, such as establishment of vegetative cover, are anticipated to continue periodically through late spring 2019. A preliminary schedule is included in Attachment 2.

Hours allowed for equipment operation during the remedial activities will be daylight hours between 7 AM and 5 PM, Monday through Friday, unless otherwise allowed in writing by NYSEG. Contractor may be on site earlier or later than actual hours of equipment operation, holding safety meetings and other daily planning associated with the site work.

## **11.0 Bid Package/Technical Execution Plan**

A Technical Execution Plan (TEP) will be prepared and submitted by the prospective contractors during the bidding process for this work for the Engineer's review and NYSEG's approval. It will describe:

- The materials, equipment, and methods to be used to perform the work;
- Drawings, specifications, and a layout sequence of the proposed odor, vapor, dust, and noise controls;
- The proposed schedule for completing the work;
- Resumes of key project personnel; and,
- Other TEP requirements as outlined in the technical specification.

The selected Contractor may be required by the Engineer to provide additional clarifications to their TEP prior to, and during the course of, the work.

## 12.0 References

AECOM, 2010. *Remedial Design Report*. January.

NYSDEC, 2008. *Record of Decision*. March.

NYSDEC, 2015. *Amended Record of Decision*. March.

Ish, 2007. *Final Feasibility Study Report*. November.

Ish, 2006. *Remedial Investigation Report*. October.

## **Attachments**

# **Attachment 1**

## **Design Drawings**

This is a detailed topographic map of the Norwich, Vermont area. The map shows the city of Norwich, Vermont, with its street grid and buildings. The city is situated on a river, the River of the North, which flows through the center of the map. The map also shows the surrounding hills and mountains, with contour lines indicating elevation. Key landmarks include the Mt Hope Cemetery, the River of the North, and the city of Norwich. The map is oriented with North at the top.

# 100% DESIGN

**NYSEG**

# AECOM

Date \_\_\_\_\_

Unauthorized alteration or addition to the document is a violation of section 7209, subdivision 2 of the New York State Education Law.

GENERAL NOTES

- 1) THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY LOCAL, STATE, AND FEDERAL PERMITS REQUIRED.
- 2) ALL ON-SITE ACTIVITIES SHALL BE IN ACCORDANCE WITH THE ENTIRE CONTRACT DOCUMENTS PACKAGE.
- 3) THE CONTRACTOR IS ADVISED THAT ADDITIONAL "NOTES" WILL BE FOUND ON SUBSEQUENT SHEETS OF THE CONTRACT PLANS AND SUCH "NOTES", WHILE PERTAINING TO THE SPECIFIC SHEETS THEY ARE PLACED ON; ALSO SUPPLEMENT THE GENERAL NOTES LISTED HEREIN.
- 4) CONTRACTOR TO PERFORM CLEARING AND GRUBBING, AS NECESSARY, WITHIN PROJECT LIMITS. CONTRACTOR IS RESPONSIBLE FOR THE REMOVAL OF ALL VEGETATION AND WILDLIFE IN ACCORDANCE WITH STATE AND LOCAL REGULATIONS INCLUDING, BUT NOT LIMITED TO, LOCAL BAT SPECIES.
- 5) CONTRACTOR SHALL CONTACT DIG-SAFE FOR UTILITY MARK OUTS PRIOR TO ANY SUBSURFACE WORK.
- 6) CONTRACTOR SHALL IMMEDIATELY REPAIR AND RESTORE ANY IMPACTS OF THE SITE WORK TO PUBLIC ROADWAYS AND SIDEWALKS, AS DIRECTED BY THE ENGINEER, TO THE SATISFACTION OF THE CITY OF NORWICH AT NO ADDITIONAL COST TO NYSEG.

SURVEY, STAKE-OUT AND AS BUILT DOCUMENTATION

- 1) CONTRACTOR SHALL OBTAIN THE SERVICES OF A NEW YORK STATE LICENSED LAND SURVEYOR FOR THE ESTABLISHMENT OF SITE CONTROLS AND THE STAKE-OUT OF THE PROPOSED WORK AS SHOWN ON THE PROJECT PLANS.
- 2) SURVEYOR SHALL LOCATE IN THE FIELD (VERTICAL AND HORIZONTAL) ALL SIGNIFICANT PROJECT COMPONENTS AND MILESTONES INCLUDING, BUT NOT LIMITED TO, EXISTING UTILITIES, FINAL LIMITS OF THE PRE-EXCAVATION, TOP OF ISS MONOLITH, BACKFILL MATERIAL LIMITS, AND ANY OTHER APPURTENANT FEATURES AS DIRECTED BY THE ENGINEER.
- 3) SURVEYOR SHALL PREPARE AND PROVIDE STAMPED AND SIGNED FINAL RECORD DRAWINGS OF THE ACTUAL WORK PERFORMED FOR EACH OF THE PROJECT COMPONENTS AND MILESTONES STATED ABOVE, IN THE FOLLOWING FORMATS:

POINT DATA (.TXT, .CSV, .XLS)

AUTOCAD (.DWG)

FOUR (4) SEALED AND SIGNED HARD COPIES
- 4) ANY SURVEY MARKERS, PRIVATE OR PUBLIC, DISTURBED BY THE CONTRACTOR'S OPERATIONS SHALL BE RESTORED TO THE ORIGINAL POSITION AT NO ADDITIONAL COST TO NYSEG.

PROTECTION OF THE TRAVELING PUBLIC

- 1) WHILE WORKING WITHIN THE CITY OF NORWICH RIGHT OF WAY (R.O.W.) THE CONTRACTOR SHALL BE REQUIRED TO FOLLOW WORK ZONE TRAFFIC CONTROL, ITEM 619 OF THE NEW YORK STATE DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS AND THE 2009 EDITION OF THE NATIONAL MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS INCLUDING THE NEW YORK STATE SUPPLEMENT.
- 2) WHILE INSTALLING AND/OR MAINTAINING THE GROUT SUPPLY PIPING A TEMPORARY LANE CLOSURE WILL BE REQUIRED. THE CONTRACTOR SHALL INSTALL AND MAINTAIN LANE CLOSURES, FOR THIS WORK AND AS ORDERED BY THE ENGINEER, IMPLEMENTING FLAGGING OPERATIONS FOR 2 LANE - 2 WAY ROADWAYS AND FLAGGING OPERATIONS FOR 2 LANE - 2 WAY INTERSECTION IN ACCORDANCE WITH THE APPLICABLE NEW YORK STATE DEPARTMENT OF TRANSPORTATION US CUSTOMARY STANDARD SHEETS 619-60 AND 619-61.
- 3) MATERIALS, EQUIPMENT AND VEHICLES SHALL NOT BE STORED OR PARKED WITHIN THE CITY OF NORWICH RIGHT OF WAY (R.O.W.).
- 4) MATERIALS, EQUIPMENT AND VEHICLES SHALL NOT BE STOPPED IN OR ALONG AN ACTIVE ROADWAY WITHOUT A LANE CLOSURE AND SUBSEQUENT FLAGGING OPERATIONS, AS ORDERED BY THE ENGINEER.
- 5) ONLY ONE SIDEWALK SHALL BE CLOSED AT A TIME WHILE INSTALLING AND/OR MAINTAINING THE GROUT SUPPLY PIPING. CONTRACTOR SHALL INSTALL "SIDEWALK CLOSED" SIGNAGE AS REQUIRED, AT THE LOCATIONS AND AS DIRECTED BY THE ENGINEER.
- 6) ALL SIDEWALKS SHALL REMAIN OPEN AND UNOBSTRUCTED, UNLESS OTHERWISE INDICATED AND APPROVED BY THE ENGINEER.
- 7) PROJECT AND DISTURBANCE LIMITS SHALL BE COMPLETELY FENCED WITH APPROPRIATE SIGNAGE, CONFORMING WITH OSHA REGULATIONS AND TO THE SATISFACTION OF THE ENGINEER, TO PROTECT THE PUBLIC AND PREVENT UNAUTHORIZED ENTRY.

GENERAL SUBSURFACE CONDITIONS:

- 1) GENERAL SUBSURFACE CONDITIONS ARE SUMMARIZED IN THE FINAL SUPPLEMENTAL REMEDIAL INVESTIGATION (SRI) REPORT, NORWICH FORMER MGP SITE, NORWICH, NEW YORK, PREPARED BY ISH, INC., OCTOBER 2006. ADDITIONAL SUBSURFACE INFORMATION FROM SOIL BORINGS AND COLLECTION WELL INSTALLATION BY AECOM CAN BE FOUND IN APPENDIX M.
- 2) AVAILABLE DATA INDICATES THAT OVERBURDEN COMPRISES FOUR GENERAL STRATA: 1) GRANULAR FILL, 2) SILTY SAND, 3) SAND AND GRAVEL, AND 4) CLAY.

GROUNDWATER CONDITIONS:

- 1) AVAILABLE DATA PROVIDED IN THE OCTOBER 2006 SRI INDICATE THAT GROUNDWATER RANGES FROM SEVEN TO FOURTEEN FEET BELOW GRADE, WITH GROUNDWATER FLOW TRENDING TO THE SOUTHWEST.

UTILITIES:

- 1) EXISTING UTILITIES SHOWN ON THE DRAWINGS ARE BASED ON THE BEST INFORMATION AVAILABLE WITHIN THE PROJECT LIMITS.
- 2) CONTRACTOR SHALL LOCATE AND VERIFY ALL UTILITY LOCATIONS AND ELEVATIONS PRIOR TO THE START OF WORK.
- 3) THE EXISTING OVERHEAD ELECTRICAL WIRES AND POLE IDENTIFIED IN FIGURE 06 WILL BE REMOVED BY NYSEG PRIOR TO THE START OF WORK.
- 4) PROMPTLY NOTIFY NYSEG IF UNMAPPED/UNKNOWN UTILITIES ARE FOUND. RELOCATE AND PROTECT ALL KNOWN AND UNKNOWN EXISTING UTILITIES, AS APPROVED BY NYSEG.

NEW YORK SUSQUEHANNA AND WESTERN RAILWAY (THE RAILWAY);

- 1) ANY RAILWAY CONSTRUCTION ACTIVITIES SHALL BE PERFORMED CONCURRENTLY WITH THE WORK TO BE COMPLETED UNDER THIS CONTRACT. CONTRACTOR SHALL COORDINATE ALL ASSIGNED WORK WITH THE RAILWAY.
- 2) THE RAILWAY WILL REMOVE OVERHEAD WIRING BETWEEN FRONT STREET AND BROWN AVENUE.
- 3) FOLLOWING OVERHEAD WIRING REMOVAL CONTRACTOR SHALL REMOVE ALL RAILWAY OVERHEAD POLES BETWEEN FRONT STREET AND BROWN AVENUE.
- 4) CONTRACTOR SHALL TEMPORARILY RELOCATE THE RAILWAY SIGNAL CONTROL BUILDING FOLLOWING OVERHEAD WIRE AND POLE REMOVAL AND PRIOR TO BEGINNING EXCAVATION WORK.
- 5) CONTRACTOR SHALL PROVIDE PLANS AND DETAILS, FOR REVIEW BY THE ENGINEER, FOR THE TEMPORARY RELOCATION AND RESTORATION OF THE SIGNAL CONTROL BUILDING.
- 6) THE TEMPORARY RELOCATION AND RESTORATION PLANS, DETAILS AND ACCOMPANYING CALCULATIONS SHALL BE STAMPED AND SIGNED BY A NEW YORK STATE PROFESSIONAL ENGINEER.
- 7) CONTRACTOR IS RESPONSIBLE FOR ANY AND ALL DAMAGES TO THE RAILWAY SIGNAL CONTROL BUILDING.
- 8) CONTRACTOR SHALL PROVIDE TRENCHING AND BACKFILLING FOR THE NEW RAILWAY UNDERGROUND WIRING IN THE LOCATIONS SHOWN ON THE PLANS. THE RAILWAY SHALL BE RESPONSIBLE FOR THE SUPPLY, INSTALLATION AND CONNECTION OF RAILWAY WIRING BETWEEN FRONT STREET AND BROWN AVENUE. CONTRACTOR SHALL BE RESPONSIBLE FOR THE HANDLING OF ALL SOILS REQUIRED TO COMPLETE RAILWAY WIRING ACTIVITIES. TRENCHING AND BACKFILLING WORK SHALL TAKE PLACE FOLLOWING ISS ACTIVITIES.
- 9) ALL WORK PERFORMED WITHIN THE RAILWAY RIGHT-OF-WAY SHALL MEET THE APPROVAL OF NYSEG AND THE RAILWAY.
- 10) CONTRACTOR SHALL PROVIDE SETTLEMENT MONITORING OF THE RAILWAY AT THE LOCATIONS SHOWN. MONITORING SHALL BE CONDUCTED A MINIMUM OF TWO TIMES A DAY OR AS DIRECTED BY THE ENGINEER.
- 11) CONTRACTOR SHALL BE RESPONSIBLE FOR THE COMPLETE RESTORATION OF ANY IMPACTS MADE TO THE RAILWAY AS SHOWN ON PROJECT PLANS AND DETAILS AND IN LOCATIONS AS DIRECTED BY THE ENGINEER AT NO COST TO THE ENGINEER/RAILWAY.
- 12) CONTRACTOR IS TO PROVIDE ACCESS TO THE RAILWAY RIGHT-OF-WAY AT ALL TIMES.

GROUT SUPPLY PIPING AND ROUTING

- 1) CONTRACTOR SHALL SUBMIT, FOR REVIEW BY THE ENGINEER AND THE CITY OF NORWICH, DETAILED PLANS AND SPECIFICATIONS OF GROUT SUPPLY FROM THE STAGING AREA TO THE ISS LOCATION AS PRELIMINARILY SHOWN ON FIGURE 11. CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN, OPERATION, AND SUPPLY OF ALL MATERIALS, EQUIPMENT AND MANPOWER NECESSARY FOR THE INSTALLATION AND MAINTENANCE OF THE GROUT SUPPLY PIPING.
- 2) CONTRACTOR IS RESPONSIBLE FOR MAINTAINING PUBLIC ACCESS TO ALL ROADWAYS AND SIDEWALKS AT ALL TIMES UNLESS APPROVED BY THE ENGINEER. AT NO TIME SHALL ANY PUBLIC ROADWAY BE CLOSED FOR MORE THAN TEN MINUTES WITHOUT WRITTEN APPROVAL FROM THE CITY OF NORWICH.
- 3) CONTRACTOR IS RESPONSIBLE FOR THE IMMEDIATE REPAIR OF ANY IMPACTS CAUSED BY SITE OPERATIONS (INCLUDING WASTE AND MATERIAL HANDLING) AT NO EXPENSE TO THE ENGINEER.
- 4) CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL UTILITIES ATOP OR ADJACENT TO THE GROUT SUPPLY PIPING.
- 5) CONTRACTOR SHALL BE RESPONSIBLE FOR ADHERING TO ALL NEW YORK STATE AND LOCAL CITY OF NORWICH REGULATIONS INCLUDING THOSE REGULATIONS REQUIRED FOR ROADWAY CONSTRUCTION, MAINTENANCE, AND CONTROL.

SITE ACTIVITY SUPPORT

- 1) CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING AID FOR THE PLACEMENT AND FURTHER ACCESS TO ALL MONITORING EQUIPMENT INCLUDING, BUT NOT LIMITED TO, COMMUNITY AIR MONITORING, NOISE, VIBRATION, AND SETTLEMENT MONITORING EQUIPMENT.
- 2) CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING AID TO ANY SITE INSPECTIONS OR THE COLLECTION OF ANY SITE SAMPLES.

PRE-EXCAVATION AND SPOILS MANAGEMENT:

- 1) CONTRACTOR SHALL PRE-EXCAVATE SOIL WITHIN THE LIMITS OF PROPOSED ISS TREATMENT TO THE GRADES INDICATED (NOMINALLY A DEPTH OF 5 FEET +/-). THE INTENT OF THE PRE-EXCAVATION IS TO ALLOW SPACE FOR CONSTRUCTION OF A 4-FOOT SOIL CAP OVER THE COMPLETED ISS MONOLITH. THE CAP IS INTENDED TO PROVIDE ISOLATION OF THE ISS MONOLITH AND PROTECTION FROM FROST. PRE-EXCAVATION ALSO PROVIDES CONTAINMENT FOR ISS GENERATED SPOILS.



**PRE-EXCAVATION AND SPOILS MANAGEMENT CON'T:**

- 2) EXCAVATED SOILS SHALL BE STOCKPILED AND STORED ON-SITE UNTIL DETERMINED SUITABLE FOR REUSE OR REQUIRED DISPOSAL OFFSITE AT A SUITABLE DISPOSAL FACILITY APPROVED BY NYSEG.
- 3) CONTRACTOR SHALL MANAGE AND COLLECT ALL SPOILS GENERATED BY ISS TREATMENT.
- 4) CONTRACTOR SHALL DISPOSE OF THE SURPLUS ISS SPOILS, FOLLOWING CHARACTERIZATION BY THE ENGINEER, AT A SUITABLE OFFSITE DISPOSAL FACILITY APPROVED BY NYSEG.
- 5) CONTRACTOR SHALL MANAGE, COLLECT AND TREAT EXCESS WATER, REGARDLESS OF SOURCE, FROM POOLING OR COLLECTING WITHIN THE PRE-EXCAVATION AREA(S) AS DIRECTED BY THE ENGINEER.

**IN-SITU SOLIDIFICATION (ISS):**

- 1) IN SITU SOLIDIFICATION (ISS) SHALL BE PERFORMED IN ACCORDANCE WITH THE TECHNICAL SPECIFICATIONS.
- 2) EXCAVATE EXPLORATORY TEST PITS TO VERIFY LOCATIONS OF UTILITIES AND POTENTIAL OBSTRUCTIONS AND INTERFERENCES.
- 3) COBBLES, BOULDERS, CONCRETE, AND OTHER DEBRIS ARE ANTICIPATED. PRE-EXCAVATE AS NECESSARY TO REMOVE DEBRIS AND OBSTRUCTIONS TO FACILITATE INSTALLATION OF ISS COLUMNS.
- 4) THE APPROXIMATE SURFACE ELEVATION CONTOURS OF THE TOP OF CLAY ARE INDICATED ON DRAWING 05. ADDITIONALLY, THE ISS TREATMENT AREA IS SUBDIVIDED INTO GRID BOXES, EACH INDICATING A DEPTH OF OVERBURDEN SOILS ABOVE THE CLAY SURFACE TO EXISTING GRADE.
- 5) ISS COLUMNS SHALL TOE INTO THE CLAY LAYER A MINIMUM OF 4-FEET AT THE TWO MOST OUTER PERIMETER COLUMNS AND 2-FEET WITHIN THE INTERIOR COLUMNS OF THE PROPOSED MONOLITH. ISS COLUMN DEPTHS WILL GENERALLY RANGE ON THE ORDER OF 20 TO 25 FEET FROM THE PRE-CUT GRADE.
- 6) ISS COLUMNS SHALL BE CONSTRUCTED USING A SINGLE OR MULTIPLE AUGER MIXING SYSTEM SPECIFICALLY DESIGNED FOR ENVIRONMENTAL REMEDIATION PROJECTS.
- 7) CONSTRUCT ISS COLUMNS AROUND ENTIRE PERIMETER PRIOR TO BEGINNING ISS TREATMENT IN THE INTERIOR OF THE AREA TO BE STABILIZED.
- 8) THE CONTRACTOR SHALL DEVELOP AN ISS COLUMN SEQUENCE PLAN FOR WORK WITHIN 25 FEET OF THE RAILROAD. THE INTENT IS TO MAINTAIN CONTINUOUS LATERAL SUPPORT OF THE TRACK. SEQUENCE CONSTRUCTION OF ISS COLUMNS ALONG THE RAILROAD BY LEAPFROGGING, SUCH THAT THERE IS A BUFFER OF UNMIXED SOIL AND/OR SOLIDIFIED ISS ON THE SIDES OF ANY COLUMN BEING MIXED. AT NO TIME SHALL ABUTTING COLUMNS BE MIXED ON THE SAME DAY. MINIMUM SET TIME FOR COLUMNS SHALL BE 48 HOURS, AS APPROVED BY THE ENGINEER. THE CONTRACTOR, AT THEIR OPTION, MAY ADJUST THE ISS MIX TO ACCELERATE STRENGTH GAIN AND DECREASE TIME REQUIRED TO ACHIEVE ADEQUATE SET.

**ISS MIX DESIGN:**

- 1) TREATED SOIL SHALL HAVE A MINIMUM UNCONFINED COMPRESSION STRENGTH OF 50 PSI AT 28 DAYS AS DESCRIBED IN THE SPECIFICATIONS. THE 50 PSI UNCONFINED COMPRESSION STRENGTH CRITERION IS INTENDED TO BE A LOWER BOUND VALUE WITH ALL TEST SAMPLES HAVING STRENGTH EQUAL TO OR GREATER THAN 50 PSI.
- 2) TREATED SOIL SHALL HAVE A MAXIMUM HYDRAULIC CONDUCTIVITY OF 1X10-6 CM/S AT 28 DAYS AS DESCRIBED IN THE SPECIFICATIONS. THE 1X10-6 CM/S HYDRAULIC CONDUCTIVITY CRITERION IS INTENDED TO BE AN UPPER BOUND VALUE WITH ALL TEST SAMPLES HAVING HYDRAULIC CONDUCTIVITIES LESS THAN OR EQUAL TO 1X10-6 CM/S.
- 3) AN ISS TREATABILITY STUDY WAS PERFORMED BY KEMRON ENVIRONMENTAL SERVICES. IT IS SUMMARIZED IN KEMRON'S NOVEMBER 10, 2009, FINAL REPORT TITLED IN SITU STABILIZATION/SOLIDIFICATION TREATABILITY STUDY. THE INTENT OF THIS TREATABILITY STUDY WAS TO VERIFY THE FEASIBILITY OF ISS AT THIS SITE AND TO DEMONSTRATE THAT ISS TREATED SOIL CAN MEET PROJECT REQUIREMENTS FOR STRENGTH AND HYDRAULIC CONDUCTIVITY.
- 4) CONTRACTOR MAY PERFORM AN INDEPENDENT TREATABILITY STUDY TO SUPPLEMENT AND/OR CONFIRM THE AVAILABLE TREATABILITY DATA. IF CONTRACTOR CHOOSES TO DO SO, THE COST OF OBTAINING SOIL FOR USE IN THE TREATABILITY STUDY AND/OR EXECUTION OF THE TREATABILITY STUDY IS SOLELY THAT OF THE CONTRACTOR.
- 5) CONTRACTOR SHALL SUBMIT FOR APPROVAL THE PROPOSED ISS MIX DESIGN IN ACCORDANCE WITH THE SPECIFICATIONS.

**SUBMITTALS:**

- 1) SUBMIT FOR APPROVAL A TECHNICAL EXECUTION PLAN DESCRIBING PROPOSED ISS MIXING EQUIPMENT AND PROCEDURES. INCLUDE PROPOSED GROUT MIX DESIGN, FIELD DEMONSTRATION TEST, AND QUALITY ASSURANCE/QUALITY CONTROL PROCEDURES.
- 2) PROVIDE DETAILED RECORDS OF ISS MIXING FOR EACH COLUMN INCLUDING SURVEYED LOCATION, DIAMETER, GROUND SURFACE ELEVATION, OFFSET FROM THEORETICAL LOCATION, DEPTH (BOTTOM ELEVATION), GROUT MIX PROPORTIONS, QUANTITY OF GROUT INJECTED, MIXING TIMES, RATE OF AUGER ROTATION, RATE OF AUGER PENETRATION AND EXTRACTION, NUMBER OF PASSES, AND ALL OTHER PERTINENT DETAILS.
- 3) PROVIDE AS-BUILT DRAWINGS, IDENTIFYING AND SUMMARIZING LOCATIONS, DIAMETERS, AND TOP AND BOTTOM ELEVATIONS OF ALL ISS COLUMNS.
- 4) PROVIDE AS-BUILT SURVEY DRAWINGS, AS INDICATED ABOVE UNDER SURVEY, STAKE-OUT AND AS BUILT DOCUMENTATION STAMPED BY A NYS LICENSED SURVEYOR.

**PROTECTION OF EXISTING FACILITIES**

- 1) PROTECT ADJACENT STRUCTURES FROM DAMAGE. THESE INCLUDE THE ADJACENT RAILWAY AND ADJACENT HOMES.
- 2) PROTECT ADJACENT FACILITIES FROM DAMAGE. THESE INCLUDE, BUT ARE NOT LIMITED TO, EXISTING UTILITIES, SIDEWALKS, CURBS, PAVEMENT, AND LIGHT POLES. REPAIR AND/OR REPLACE DAMAGED FACILITIES AS APPROVED BY NYSEG AT NO ADDITIONAL COST.

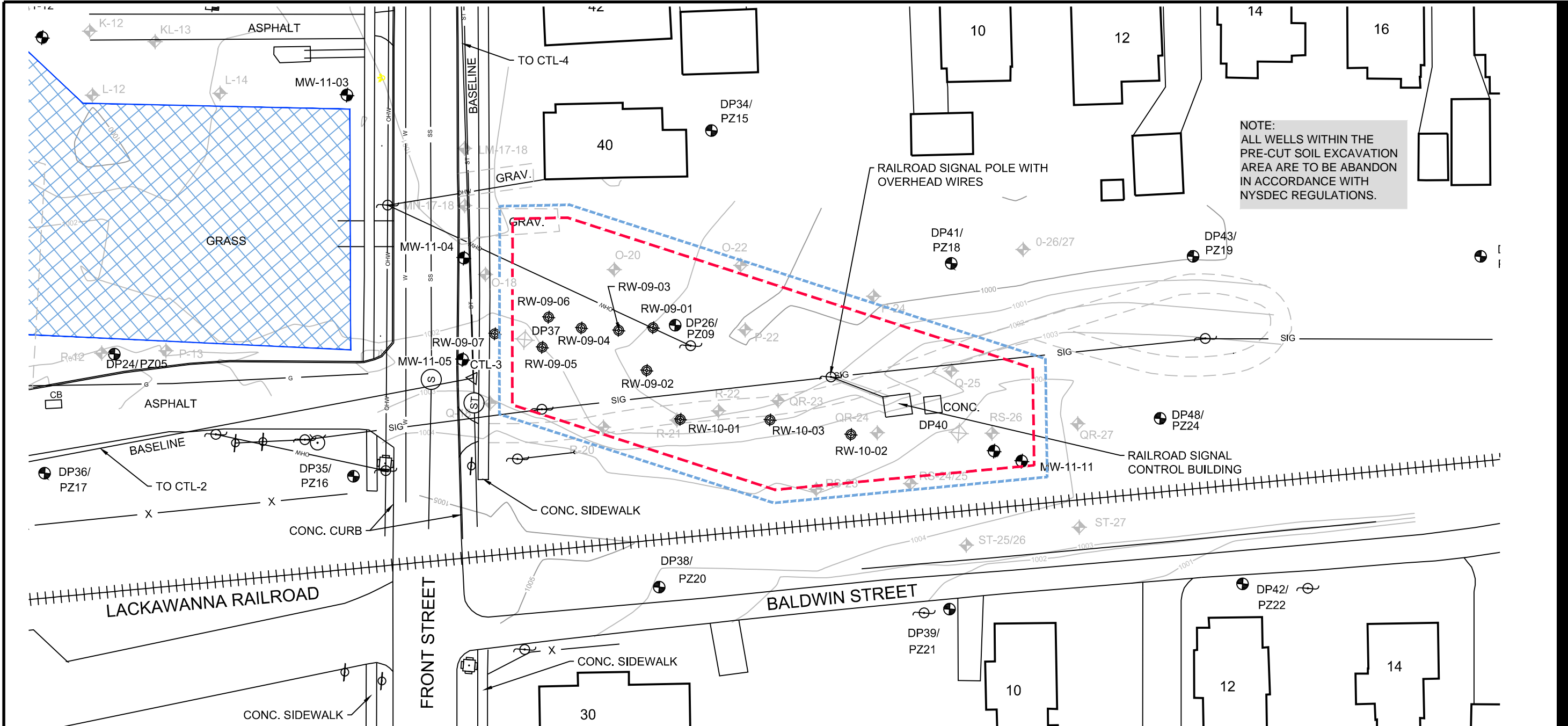
**SITE MONITORING:**

- 1) ALL EXISTING STRUCTURE WITHIN 100 FEET OF THE PROPOSED AREA OF DISTURBANCE, INCLUDING THE RAILWAY LOCATIONS SHOWN ON THE DRAWINGS, SHALL BE MONITORED FOR VIBRATION AND SETTLEMENT, SEE DRAWING 05.
- 2) VIBRATIONS RESULTING FROM THE CONTRACTOR'S ACTIONS SHALL NOT EXCEED A PEAK PARTICLE VELOCITY OF 1 INCH PER SECOND (1 IPS). AS NECESSARY, THE CONTRACTOR SHALL MODIFY SITE OPERATIONS TO LIMIT THE MEASURED PEAK PARTICLE VELOCITY TO 1 IPS.
- 3) SETTLEMENT RESULTING FROM THE CONTRACTOR'S ACTIONS SHALL BE MONITORED FOR A WARNING LEVEL OF 0.25" AND A NOT TO EXCEED LEVEL OF 0.5" BELOW EXISTING HORIZONTAL AND /OR VERTICAL ELEVATION MEASUREMENTS. AS NECESSARY, THE CONTRACTOR SHALL MODIFY SITE OPERATIONS TO LIMIT THE MEASURED SETTLEMENT, AS DIRECTED BY THE ENGINEER.

**BACKFILL:**

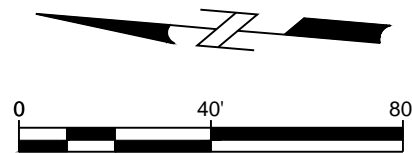
- 1) PRIOR TO USE ON-SITE, EXCAVATED SOILS SHALL BE TESTED BY THE ENGINEER. IMPORTED BACKFILL SHALL BE TESTED BY THE CONTRACTOR AND SUBMITTED TO THE ENGINEER FOR APPROVAL. BACKFILL MATERIALS MUST MEET THE REQUIREMENTS OF NYSDEC PART 375-6.8(B) REQUIREMENTS.
- 2) PER DER-10 REQUIREMENTS, POTENTIAL RE-USE SOIL AND IMPORTED BACKFILL SHALL BE SAMPLED AND ANALYZED, BY THE ENGINEER, FOR THE FOLLOWING ANALYSES - VOCs, SVOCS, PCBS, PESTICIDES AND METALS. POTENTIAL REUSE SOIL AND IMPORTED BACKFILL SHALL BE SAMPLED AT THE RESPECTIVE FREQUENCIES OF 1 SAMPLE PER 500 CUBIC YARDS AND A MINIMUM OF ONE SAMPLE PER BORROW SOURCE FOR THIS PURPOSE.
- 3) PREVIOUSLY EXCAVATED SOILS AND IMPORTED BACKFILL SHALL MEET THE REQUIREMENTS OF NYSDOT SPECIFICATION SECTION 203.03 - EMBANKMENT IN PLACE. CONTRACTOR SHALL PROVIDE A GRADATION ANALYSIS AND MOISTURE DENSITY RELATIONSHIP TEST (PROCTOR) FOR EACH PROPOSED SOURCE. COMPACTION SHALL BE 95 PERCENT OF THE STANDARD PROCTOR MAXIMUM DENSITY.





PLAN

TYPICAL LEGEND



MAP REFERENCE:

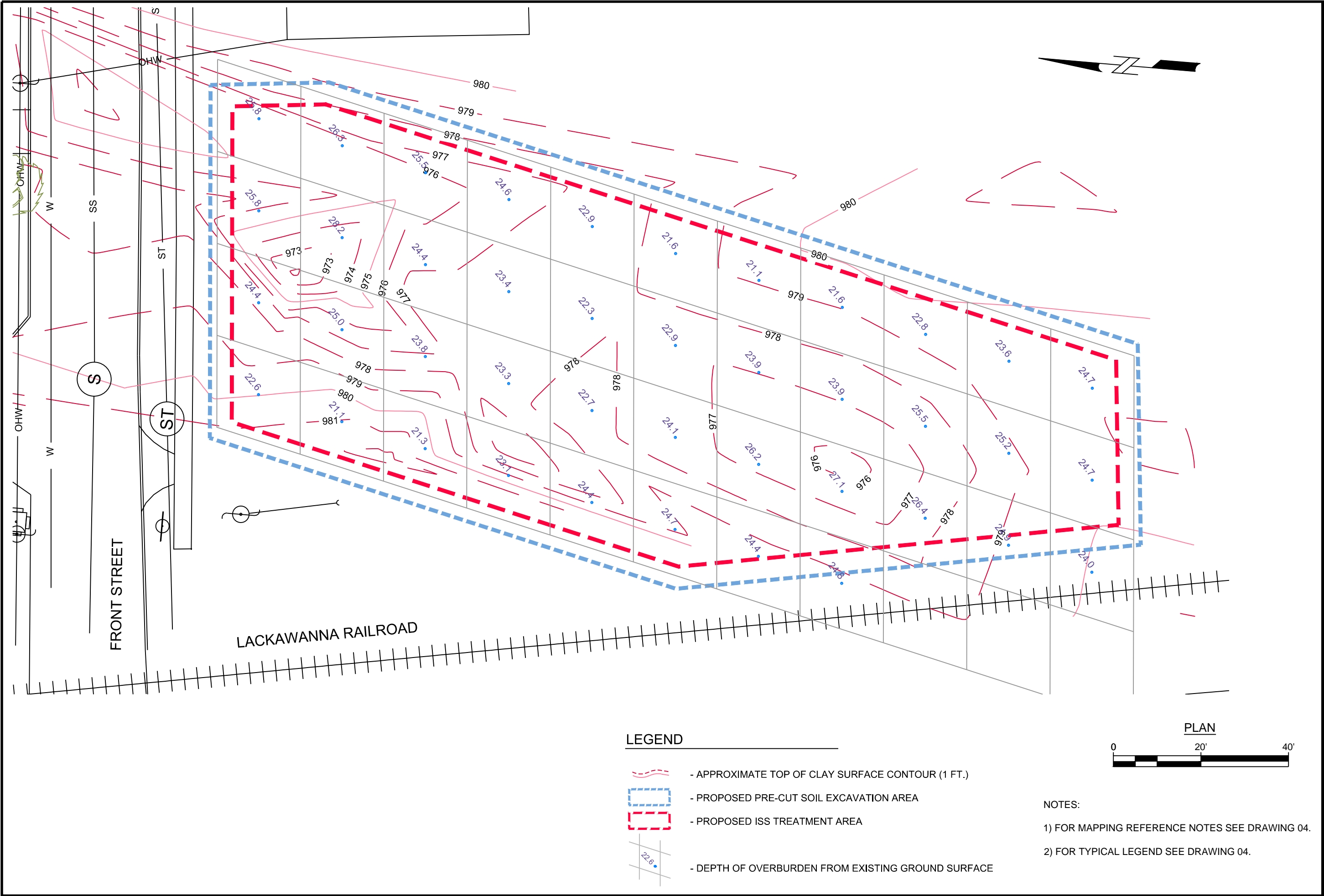
- 1) BASE MAPPING PROVIDED BY NYSEG.
- 2) HORIZONTAL DATUM: NAD 83 STATE PLANE: NEW YORK CENTRAL.
- 3) VERTICAL DATUM: NAVD 88.

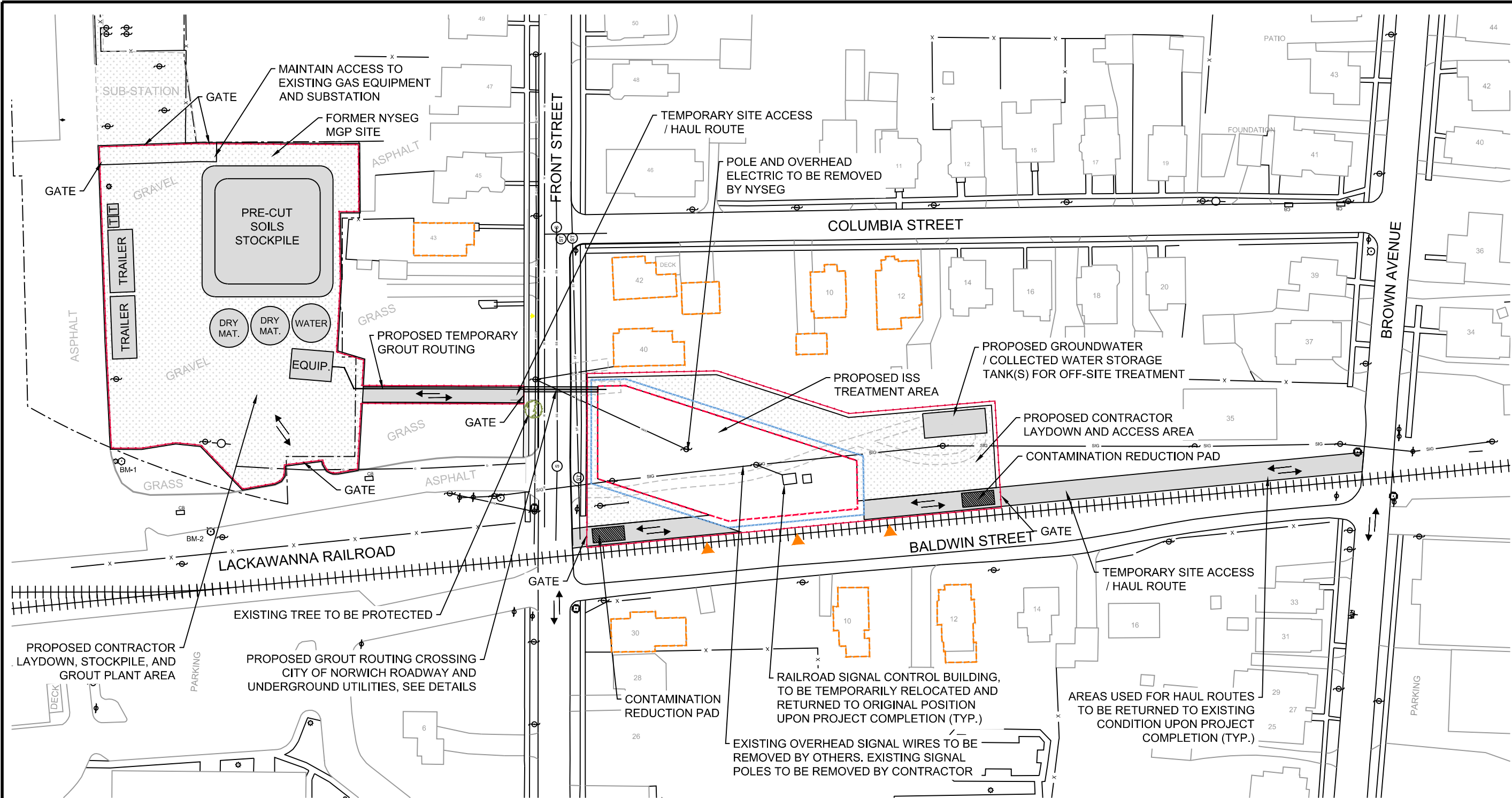
	- BUILDING LINE / NUMBER		- STORM SEWER MANHOLE
	- APPROX. PROPERTY BOUNDARY		- CATCH BASIN
	- CONTROL POINT		- STORM SEWER
	- BENCHMARK		- WATER MAIN
	- UTILITY POLE W/GUY		- GAS MAIN
	- POWER POLE		- OVERHEAD WIRE (ELEC, TELE, CABLE)
	- LIGHT POLE		- OVERHEAD RAILROAD SIGNAL WIRES
	- FIRE HYDRANT		- FENCE LINE
	- SANITARY SEWER MANHOLE		- GRAVEL DRIVE
	- SANITARY SEWER		- EXISTING GRADE SURFACE CONTOUR

	- LIMITS OF 2010 / 2011 ISS TREATMENT AREA
	- PROPOSED PRE-CUT SOIL EXCAVATION AREA
	- PROPOSED ISS TREATMENT AREA

HISTORICAL SAMPLE KEY

- SPARGE POINT MONITORING POINT
- SPARGE WELL
- PIEZOMETER
- DIRECT PUSH (PRE-2009)
- DIRECT PUSH (2009)
- RECOVERY WELL (2009/2010)
- MONITORING WELL (2011)



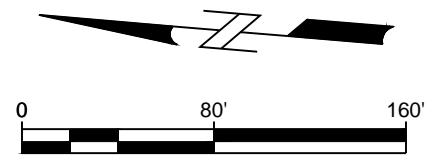


NOTES:

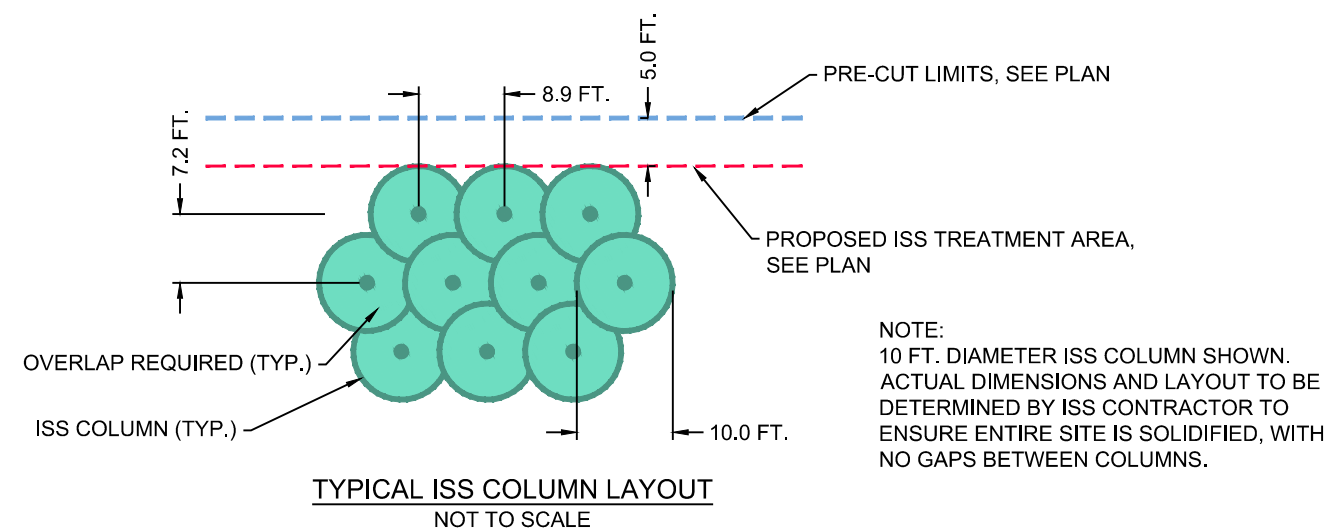
- 1) FOR MAPPING REFERENCE NOTES SEE DRAWING 04.
- 2) FOR TYPICAL LEGEND SEE DRAWING 04.
- 3) FOR THE PROTECTION OF THE GENERAL PUBLIC SITE SECURITY FENCING WITH LOCKING GATES SHALL BE INSTALLED AND MAINTAINED AROUND ALL AREAS OF WORK AND/OR DISTURBANCE.
- 4) PRE-CUT SOILS STOCKPILE AREA LOCATION SHOWN IS APPROXIMATE. CONTRACTOR SHALL ARRANGE PILE(S) TO ADEQUATELY STORE AND MAINTAIN SOILS REQUIRED.

LEGEND

- PROPOSED PRE-CUT SOIL EXCAVATION AREA
- PROPOSED ISS TREATMENT AREA
- SITE SECURITY FENCE
- STRUCTURE TO BE MONITORED FOR VIBRATION AND SETTLEMENT
- PROPOSED RAILROAD MONITORING LOCATION



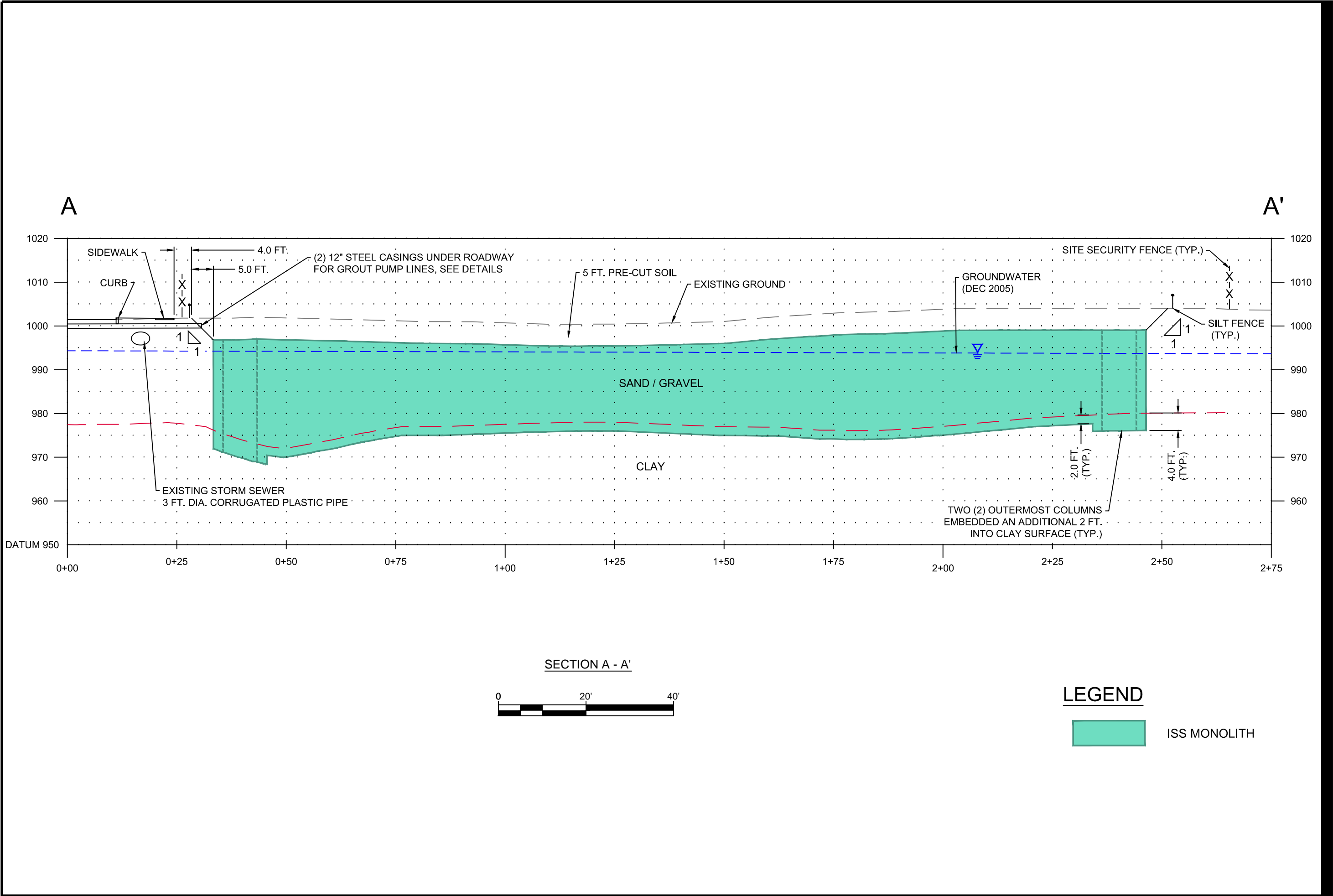


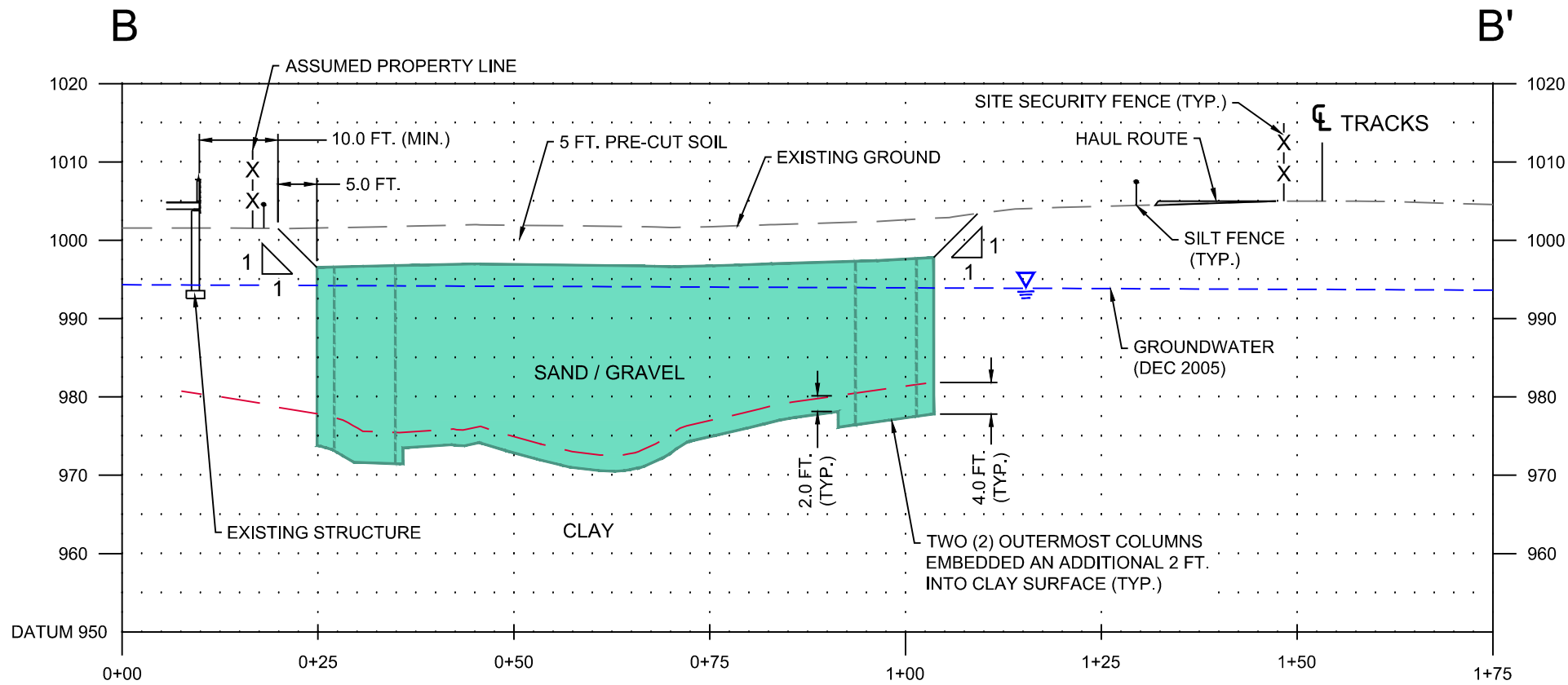


- PROPOSED PRE-CUT SOIL EXCAVATION AREA
- PROPOSED ISS TREATMENT AREA
- SITE SECURITY FENCE
- SILT FENCE
- SECTION LOCATION

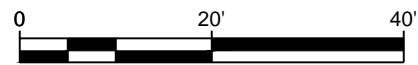
- 1) FOR MAPPING REFERENCE NOTES SEE DRAWING 04.
- 2) FOR TYPICAL LEGEND SEE DRAWING 04.
- 3) FOR THE PROTECTION OF THE GENERAL PUBLIC SITE SECURITY FENCING WITH LOCKING GATES SHALL BE INSTALLED AND MAINTAINED AROUND ALL AREAS OF WORK AND/OR DISTURBANCE.
- 4) SILT FENCE SHALL BE INSTALLED AND MAINTAINED AROUND ALL AREAS OF WORK AND/OR DISTURBANCE.

NYSEG - FORMER NORWICH  
MANUFACTURED GAS PLANT SITE  
NORWICH, NEW YORK  
Project No.: 60345362 Date: JULY 20





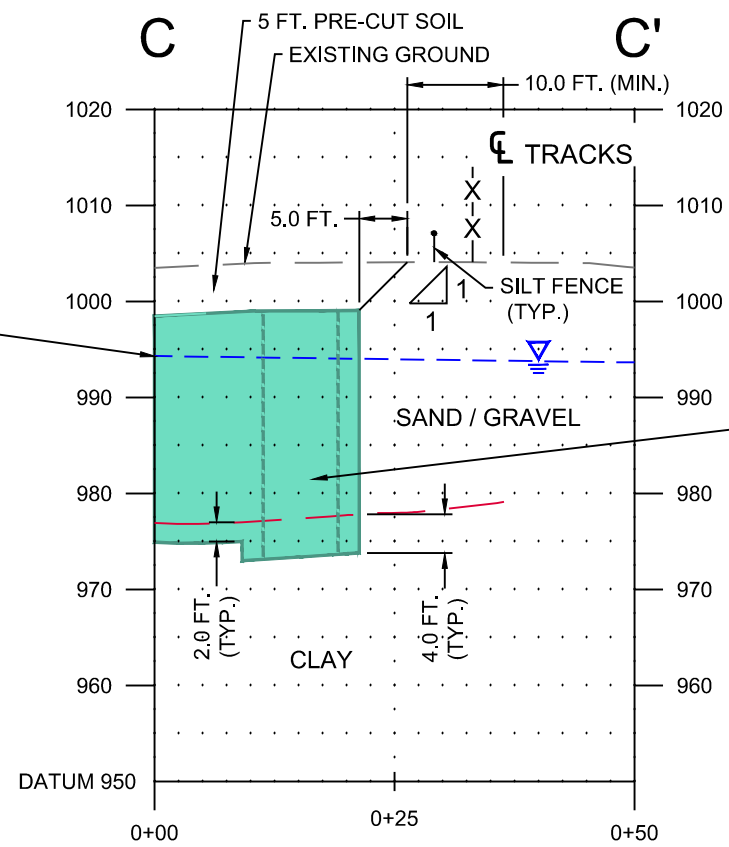
SECTION B - B'



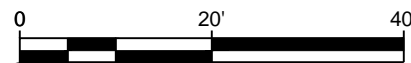
LEGEND

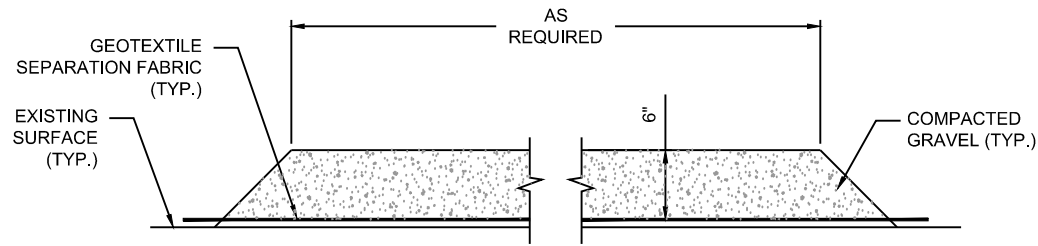


ISS MONOLITH



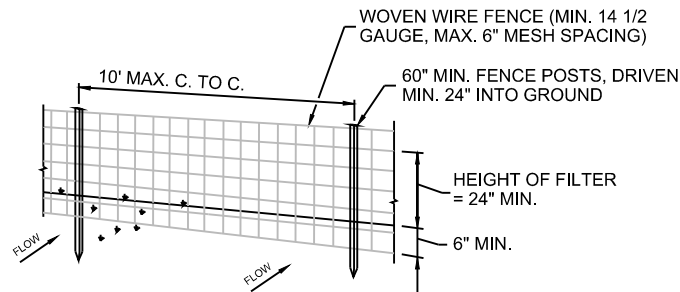
SECTION C - C'



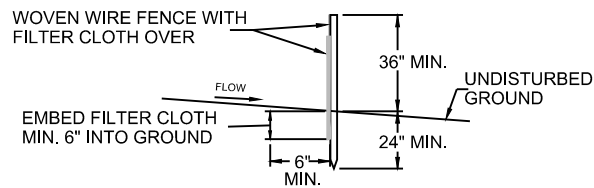


### TEMPORARY SITE ACCESS / HAUL ROUTE

N.T.S.



PERSPECTIVE VIEW



SECTION

### SILT FENCE DETAILS

N.T.S.

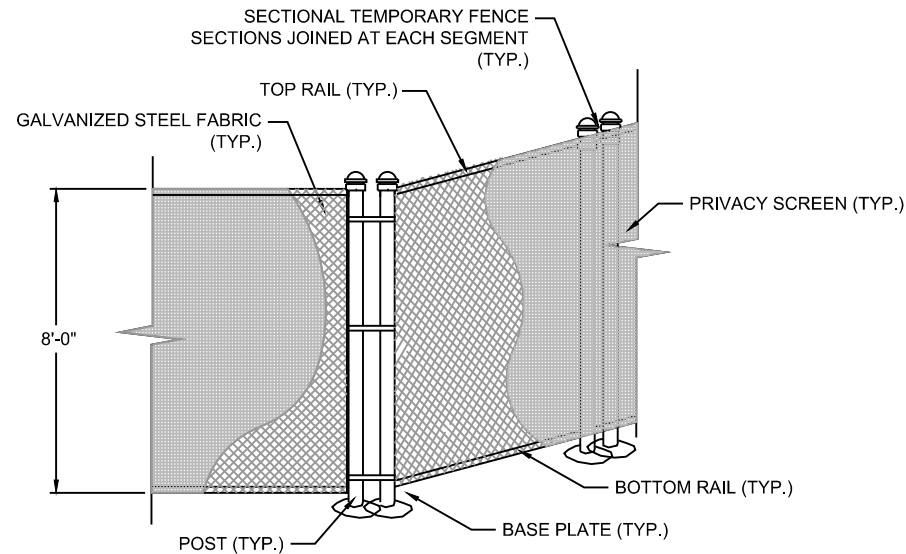
#### SILT FENCE NOTES:

1. WOVEN WIRE FENCE TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES OR STAPLES.
2. FILTER CLOTH TO BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED EVERY 24" AT TOP AND MID SECTION.
3. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVERLAPPED BY SIX INCHES AND FOLDED.
4. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN "BULGES" DEVELOP IN THE SILT FENCE.

POSTS:  
TYPE OR 2" HARDWOOD.

FENCE:  
WOVEN WIRE, 14 1/2 GA.  
6" MAX. MESH OPENING.

FILTER CLOTH:  
FILTER X. MIRAFI 100X.  
STABILINKA T140N OR  
APPROVED EQUAL.



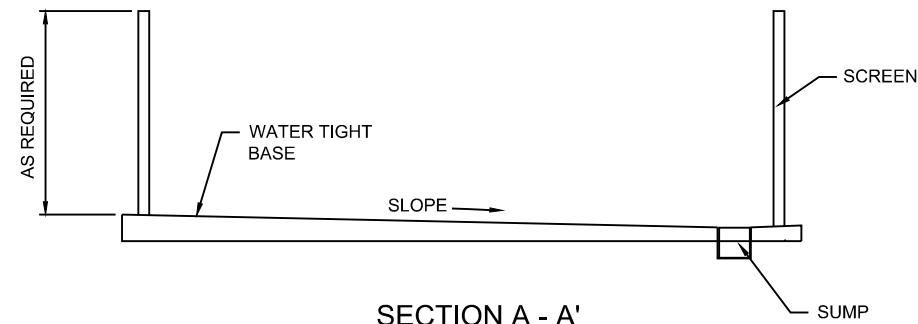
DETAIL

### TEMPORARY SECURITY FENCE

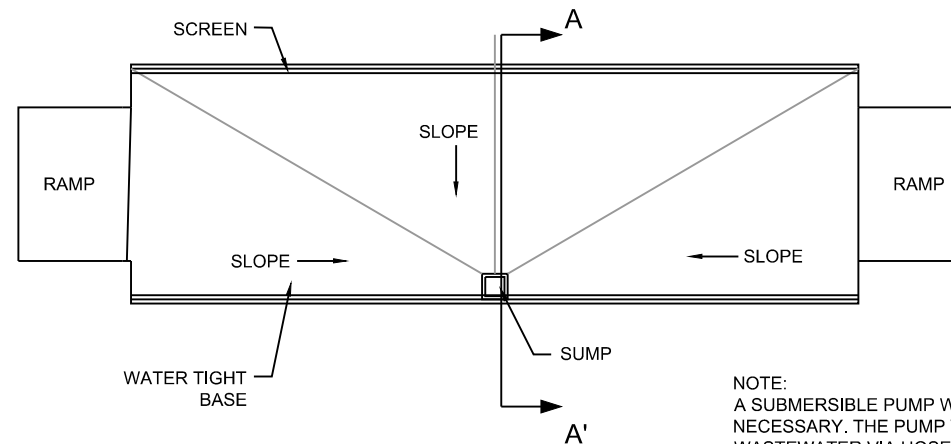
N.T.S.

#### NOTES:

- 1) CONTRACTOR SHALL MAINTAIN INTEGRITY OF SECURITY FENCING AND ENCLOSURE AT ALL TIMES.
- 2) POSTS SHALL BE SET INTO THE GROUND OR CONNECTED TO BASE PLATES AND SHALL BE SUFFICIENTLY WEIGHTED TO RESIST OVERTURNING.



SECTION A - A'



PLAN

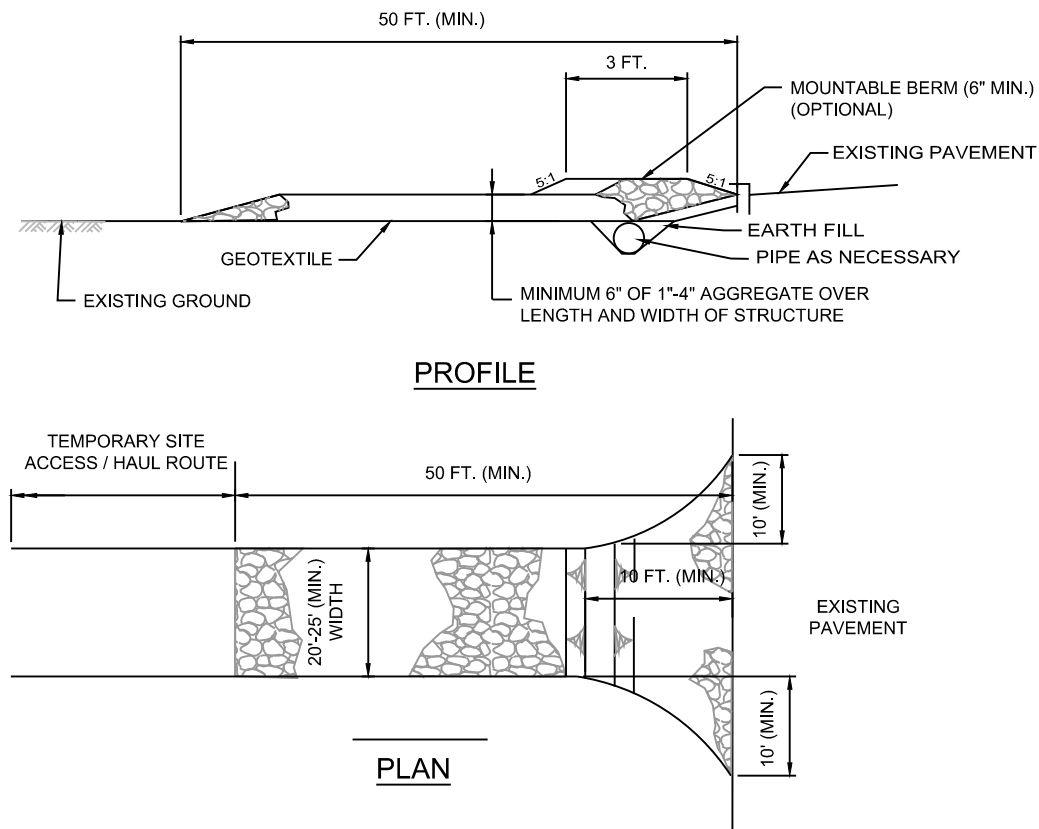
### EQUIPMENT CONTAMINATION REDUCTION PAD

N.T.S.

NOTE:  
A SUBMERSIBLE PUMP WILL BE PLACED IN SUMP AS NECESSARY. THE PUMP WILL TRANSPORT WASTEWATER VIA HOSE TO PORTABLE CONTAINERS FOR DISPOSAL.

Project Management Initials: \_\_\_\_\_ Designer: \_\_\_\_\_ Checked: \_\_\_\_\_ Approved: \_\_\_\_\_ ANS I B 11" x 17"

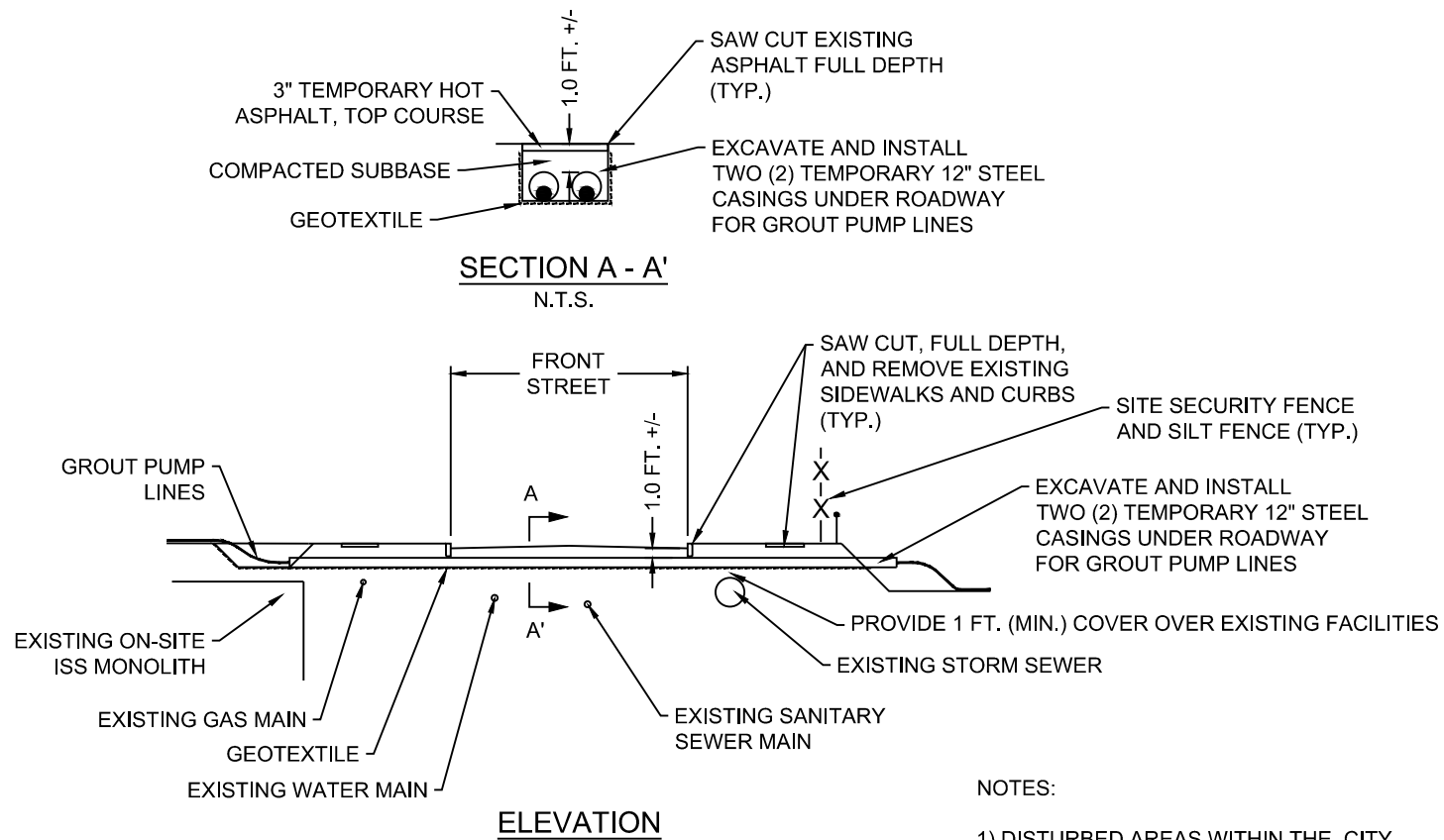
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**STABILIZED CONSTRUCTION ACCESS ROAD**  
N.T.S.

STABILIZED CONSTRUCTION ENTRANCE NOTES:

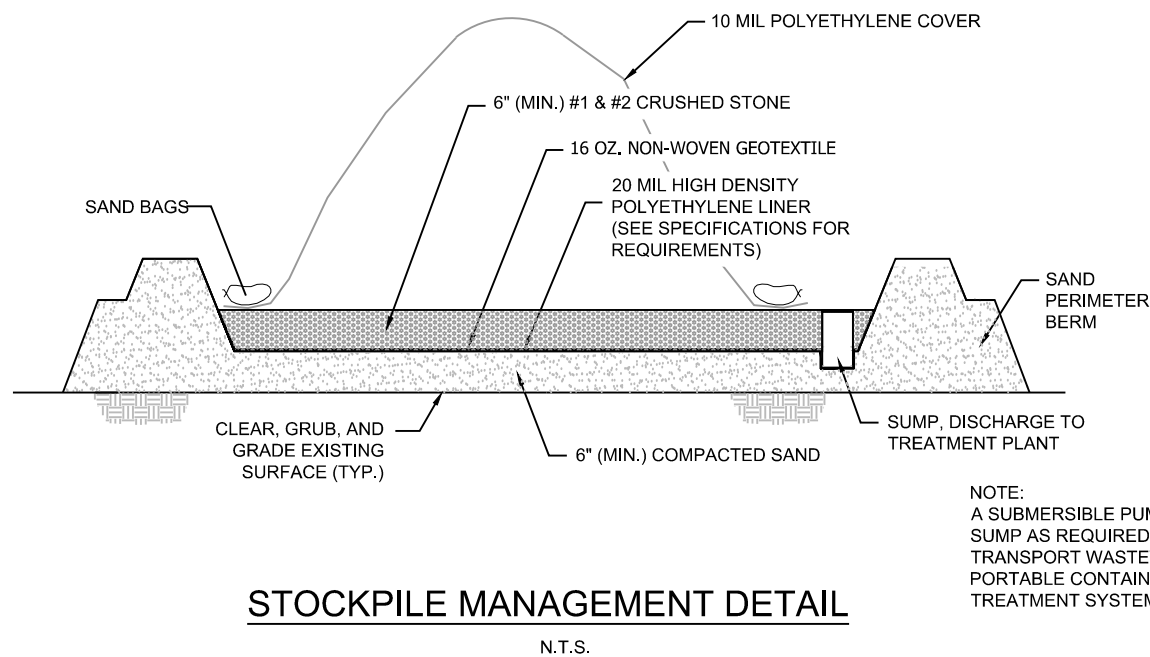
- 1) STONE SIZE - USE 1 - 4 INCH STONE, OR RECLAIMED OR RECYCLED CONCRETE
- 2) LENGTH - NOT LESS THAN 50 FT.
- 3) THICKNESS - NOT LESS THAN 6 INCHES.
- 4) WIDTH - 12 FT. MINIMUM, BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS, 24 FOOT MINIMUM IF SINGLE ENTRANCE TO SITE.
- 5) GEOTEXTILE - WILL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING STONE.
- 6) SURFACE WATER - ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCES SHALL BE PIPED BENEATH THE ENTRANCE. IF PIPING IS IMPRACTICAL, A MOUNTABLE BERM WITH 5:1 SLOPE WILL BE PERMITTED.
- 7) MAINTENANCE - THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO THE PUBLIC RIGHTS-OF-WAY OR ADJACENT PRIVATE PROPERTY, ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO THESE AREAS SHALL BE REMOVED IMMEDIATELY.
- 8) WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH STONE AND WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE.
- 9) PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED AFTER EACH RAIN EVENT.
- 10) ALIGN STABILIZED CONSTRUCTION ENTRANCE WITH EXISTING CURB CUT.



**TEMPORARY GROUT PUMPING LINE CROSSING**  
N.T.S.

NOTES:

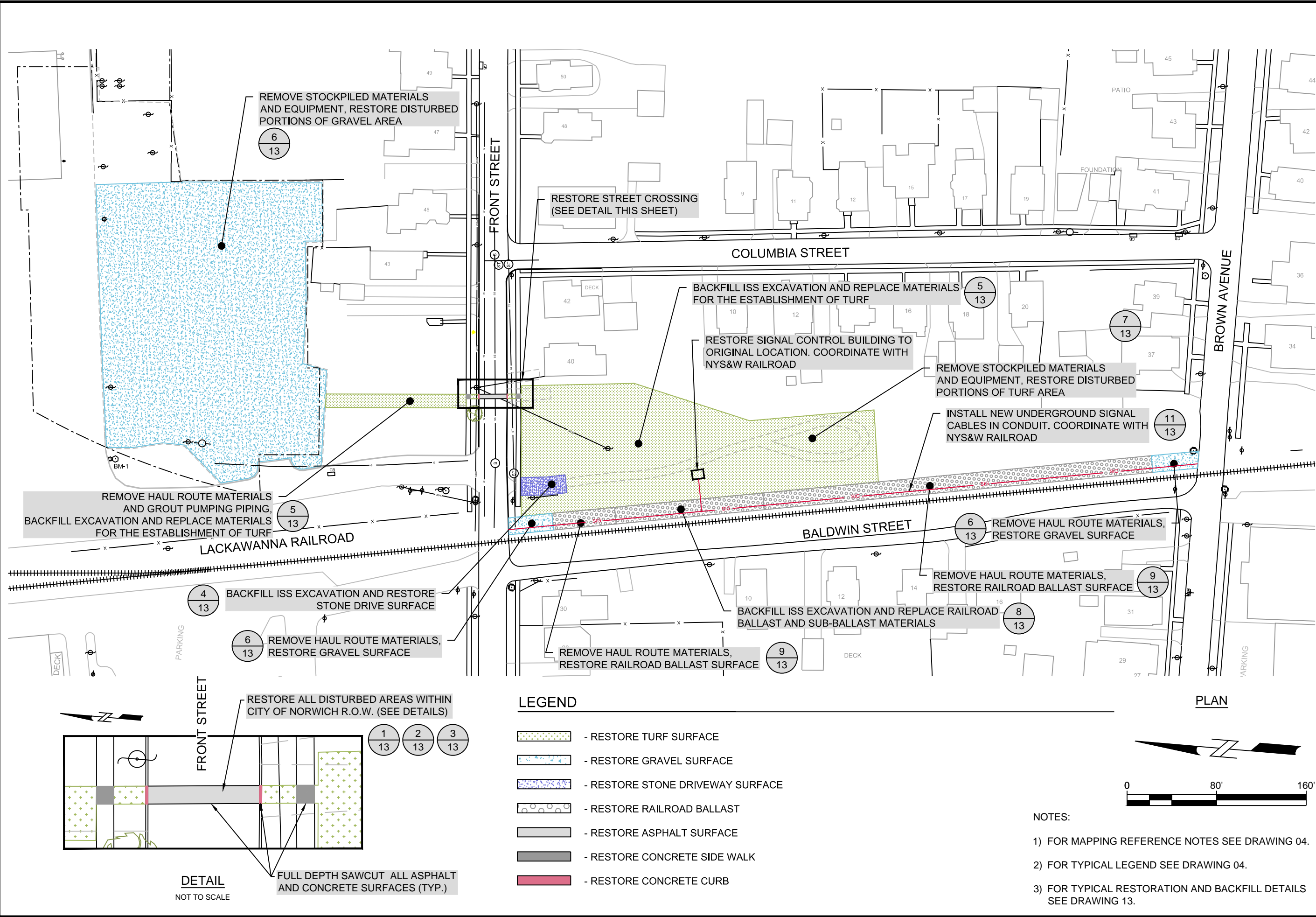
- 1) DISTURBED AREAS WITHIN THE CITY OF NORWICH RIGHT OF WAY SHALL BE RESTORED TO THE SATISFACTION OF THE ENGINEER AND THE CITY OF NORWICH. ALL MATERIALS SHALL BE IN ACCORDANCE WITH NYSDOT STANDARD SPECIFICATIONS.
- 2) CONTRACTOR SHALL HAND DIG WITHIN 5 FT. OF UTILITY MARK-OUT TO EXPOSE BURIED UTILITIES.

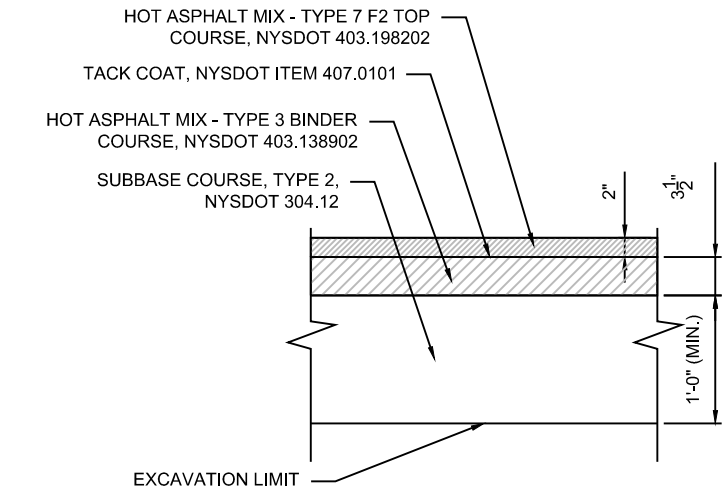


**STOCKPILE MANAGEMENT DETAIL**  
N.T.S.

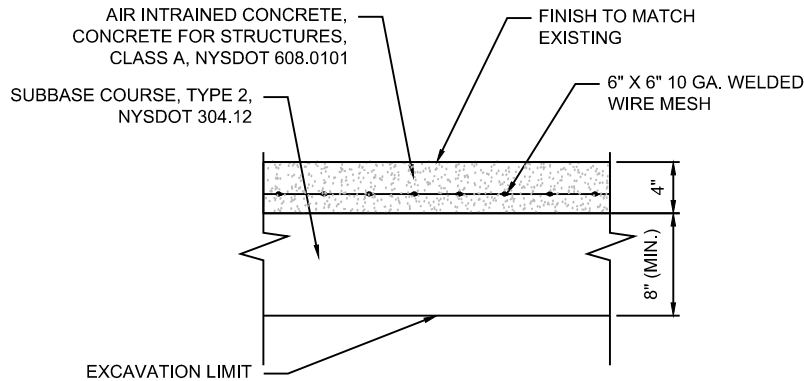
NOTE:  
A SUBMERSIBLE PUMP WILL BE PLACED IN SUMP AS REQUIRED. THE PUMP WILL TRANSPORT WASTEWATER VIA HOSE OR PORTABLE CONTAINER TO PROJECT WATER TREATMENT SYSTEM.



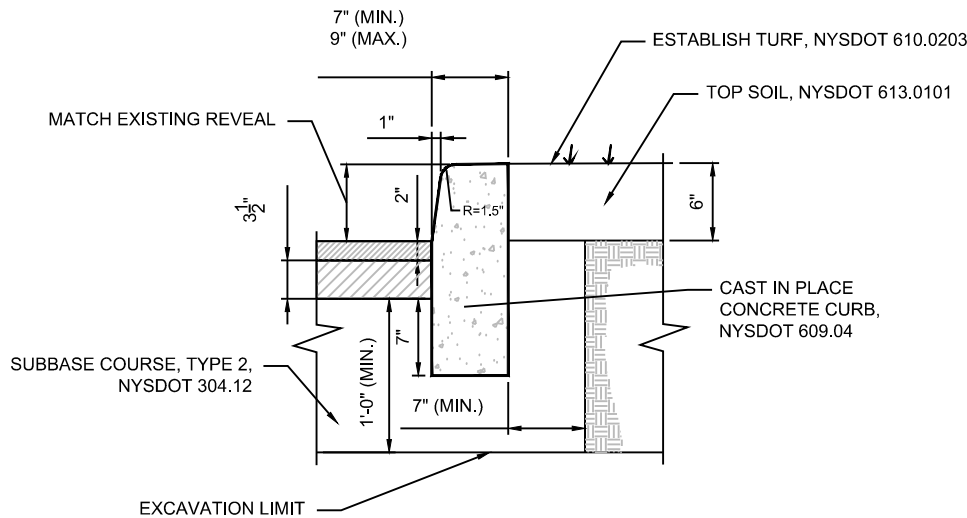




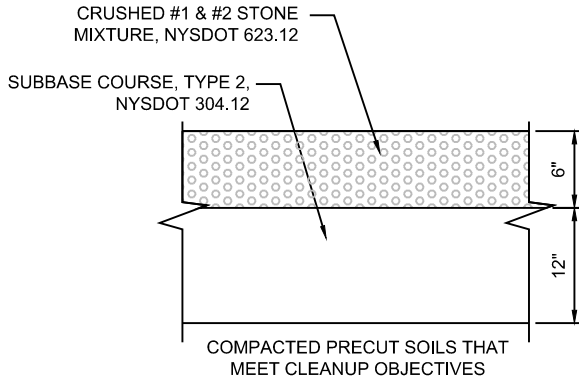
1  
13  
 TYPICAL ROADWAY SECTION  
 NOT TO SCALE



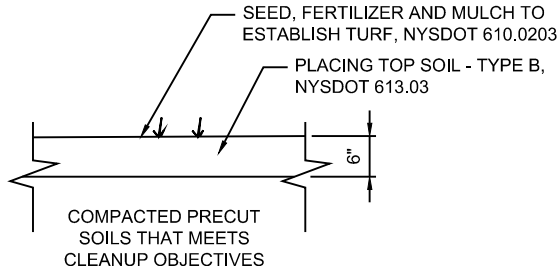
2  
13  
 CONCRETE SIDEWALK  
 NOT TO SCALE



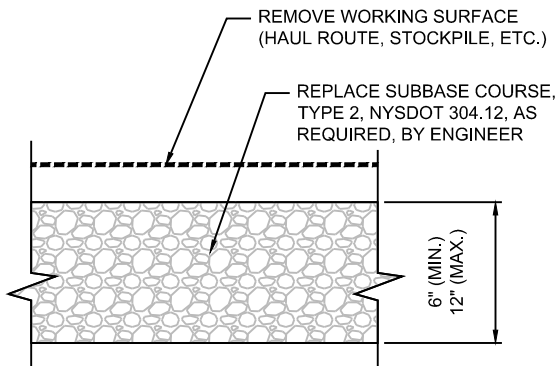
3  
13  
 TYPICAL CIP CONCRETE CURB SECTION  
 NOT TO SCALE



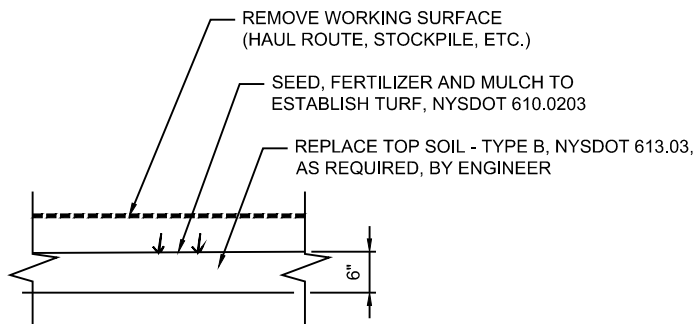
4  
13  
 ESTABLISH STONE DRIVEWAY SURFACE  
 NOT TO SCALE



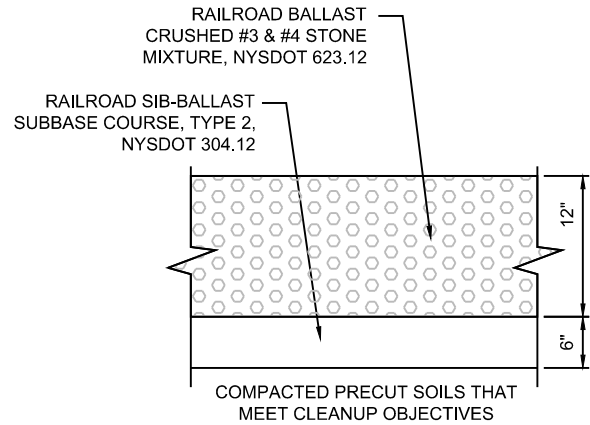
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13  
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 NOT TO SCALE



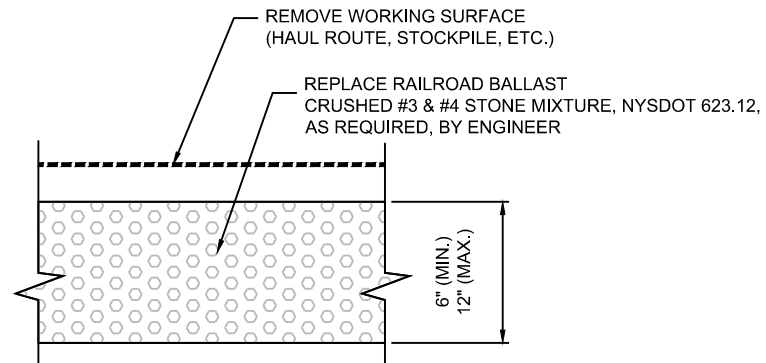
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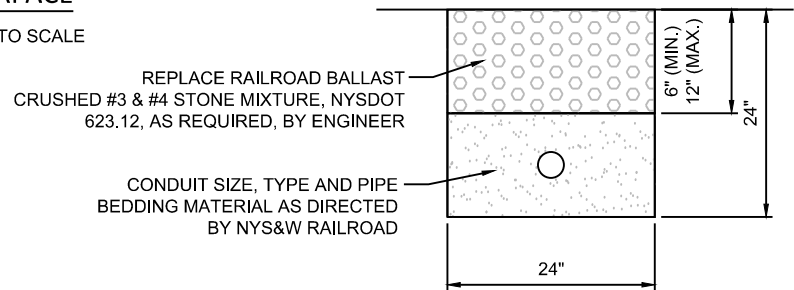
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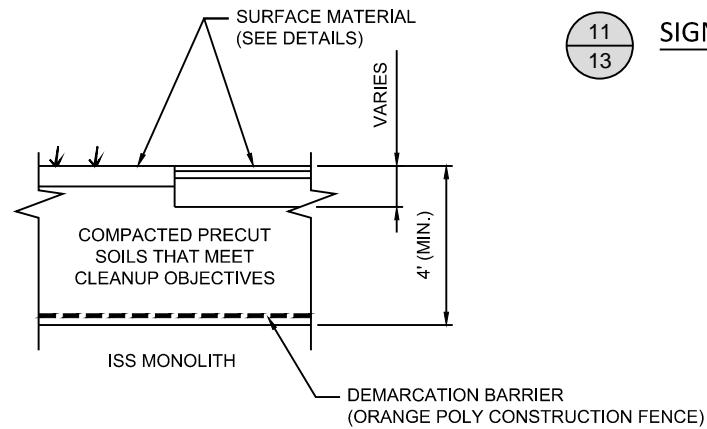
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13  
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 NOT TO SCALE



9  
13  
 RESTORE RAILROAD BALLAST SURFACE  
 NOT TO SCALE



11  
13  
 SIGNAL CONDUIT TRENCH  
 NOT TO SCALE



10  
13  
 TYPICAL BACKFILL SECTION  
 NOT TO SCALE

# **Attachment 2**

## **Specifications**

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### **Bid Schedules**

Schedule A- Schedule of Quantities and Prices
Schedule B- List of Addenda
Schedule C- Schedule of Materials
Schedule D- List of Subcontractors
Schedule E- List of Equipment
Schedule F- Construction Milestones
Schedule G- List of Personnel

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**SECTION 01110****SUMMARY OF WORK****PART 1 – GENERAL****1.01. SECTION INCLUDES:**

- A. Defined Terms
- B. Existing Conditions
- C. Project Summary
- D. Work by Others
- E. Work Sequence

**1.02. DEFINED TERMS:**

- A. **Engineer:** Engineer, who is managing the Project in the interest of the Owner.
- B. **Engineer Field Order (AFO):** A written notice by the Engineer responding to RFI, clarifying contract documents or directing Contractor to comply with the Work as detailed in the Contract Documents.
- C. **Agreement:** A term synonymous with the Contract between New York State Electric and Gas Corporation (NYSEG) the Owner and the Contractor.
- D. **CAMP:** Community Air Monitoring Plan.
- E. **Application for Payment:** The form, set forth in the Bidding Documents and accepted by the Engineer, which is to be used by Contractor in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.
- F. **Bid:** The offer or construction proposal of the Bidder submitted on the prescribed form(s) setting forth the prices for the Work to be performed.
- G. **Bid Form:** The form provided with the Bidding Documents, including Schedules A through G, which must be executed by the Bidder.
- H. **Bid Item:** A part of the Work, listed on Schedule A, Schedule of Quantities and Prices, which is defined in the Specifications and measured for payment in accordance with the Specifications.
- I. **Bidder:** One who submits a Bid directly to NYSEG as distinct from a sub-Bidder, who submits a bid to a Bidder.

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**SECTION 01110****SUMMARY OF WORK**

- J. Bidding Documents:** The documents issued by NYSEG setting the requirements for the Work and the procedures for submitting bids: the advertisement or Invitation to Bid, Bid Form, Specifications, and Drawings.
- K. Change Order:** A written instrument, in the specified form, executed by NYSEG and Contractor that changes the Contract Price or Contract Time described in Section 01250 of the Specifications.
- L. Confirmation Sample:** Sample of soil obtained from floor or wall of an excavation, or treated water to be discharged, sent to an outside analytical laboratory to determine if the sample meets applicable requirements.
- M. COI:** Constituents of interest. The chemical compounds that are typically present at an MGP site. The COI consist of volatile organic compounds and semi-volatile organic compounds.
- N. Construction Milestones:** Those activities and required completion dates provided on Bid Form Schedule F that are deemed critical for ensuring that the Work process as required.
- O. Contract / Contract Documents:** The Contract between New York State Electric and Gas Corporation and the Contractor, as defined by the Contract Documents. Contract Documents include New York State Electric and Gas Corporation Purchase Order, Terms and Conditions, Bid Form, and Bid Form Schedules A through G, the Specifications, the Drawings, Project Plans identified in this Specifications Section, any properly executed Change Orders and Work Change Directives, and any properly executed Work Orders or addendums pertaining to Work set forth in the Specifications or Change Orders.
- P. Contract Price:** The amount payable to Contractor for completion of the Work in accordance with the Contract Documents as stated in the Agreement.
- Q. Contract Times:** The period stated in the Bid Form Schedule F required to complete the specified Milestones, to achieve Substantial Completion or to complete the Work.
- R. Contractor:** The person, firm, or corporation with whom NYSEG has entered into the Agreement to perform the Work specified herein.
- S. Daily Construction Report:** The Contractor's Daily Construction Report described in Specifications Section 01320.

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## SECTION 01110

### SUMMARY OF WORK

- T. Decontamination Zone:** Transition area between the Exclusion Zone(s) and the Support Zone(s) or other non-exclusion areas of the Secured Zone(s) where impacted soil and other undesirable materials can be cleaned from personnel and equipment.
- U. Disturbed Areas:** Areas that have been disrupted or otherwise changed from their pre-construction conditions by the Contractor's activities that have not been restored as required by the Contract Documents.
- V. Drawings:** The Drawings that show the scope, extent, and character of the Work to be furnished and performed by Contractor and which have been prepared or approved by the Engineer and are included within or referred to in the Contract Documents. Shop Drawings are not Drawings as so defined.
- W. Engineer:** Engineer or its designated agent authorized to monitor conformance of the Contractor's Work with the Specifications and Drawings. The term Engineer and Engineer may be used interchangeably in this Specification.
- X. Engineer's HASP:** The Site-Specific Health and Safety Plan provided by the Engineer.
- Y. Exclusion Zone:** An area within the Secured Zone with controlled access due to the presence of Impacted Materials and other potential threats to human health or safety.
- Z. HASP:** The Site-Specific Health and Safety Plan prepared by the Contractor described in Specifications Section 01415.
- AA. Impacted:** An area, object, or material that contains or has been in contact with a substance at concentrations exceeding applicable standards or guidelines for that substance.
- BB. Impacted Soil; Impacted Water:** Soil or water determined to contain chemical constituents in concentrations exceeding applicable Regulatory guidelines.
- CC. Impacted Materials:** Impacted Soil and/or Water.
- DD. Invitation to Bid:** The letter or other transmittal attached to the Bidding Documents.
- EE. Issuing Office:** The office of the Owner from which the Bidding Documents are to be issued and where the bidding procedures are to be administered is identified below:

New York State Electric and Gas Corporation

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## SECTION 01110

### SUMMARY OF WORK

James A. Carrigg Center  
18 Link Drive  
Binghamton, NY 13902-5224  
Attn:  
Phone:  
e-mail:

- FF. Laws and Regulations; Laws or Regulations:** Any and all applicable laws, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.
- GG. MGP:** Manufactured Gas Plant.
- HH. MGP Residual:** By products and chemical residues of past MGP operations found as NAPL or as contaminants in soil, groundwater, or surface water.
- II. NAPL:** Non-aqueous phase liquid.
- JJ. Notice of Award:** The written notice by NYSEG to Contractor stating that upon compliance with the conditions stated therein, within the time period specified, NYSEG shall issue the Work Order for the Work under the existing Agreement.
- KK. Non-Conforming:** An adjective, which when modifying the word Work, refers to Work that is unsatisfactory, faulty, or deficient, in that it does not meet the requirements of a specified inspection, reference standard, test, approval, or performance requirement referred to in the Specifications or Drawings, or has been damaged prior to Engineer's recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion).
- LL. Normal Work Hours:** The hours during which the Contractor may perform the Work as defined in the Specifications.
- MM. Owner:** New York State Electric and Gas Corporation own the Work.
- NN. PPE:** Personal Protective Equipment.
- OO. Progress Schedule:** The Progress Schedule described in Specifications Section 01320.
- PP. Project:** Remediation of Soils and Site Restoration - Norwich Gas Plant Site.

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**SECTION 01110****SUMMARY OF WORK**

- QQ. Project Engineer:** The individual who may be assigned to the Project by the Engineer to provide on-site Engineering support during construction.
- RR. Project Operations Plan:** A written Work plan, submitted by awarded contractor in accordance with the requirements of the Contract Documents that details work methods, materials, and sequences of specific Work items.
- SS. Project Plans:** Project Plans which will be considered Contract Documents include the Contractor's Technical Execution Plan, the Contractor's and Engineer's Health and Safety Plans, the Contractor's Stormwater Pollution Prevention Plan, the Community Air Monitoring Plan, the Citizen's Participation Plan, the Transportation Plan, and the Permitting Plan.
- TT. Project Site:** The Project Site is the Norwich MGP site, located at 24 Birdsall Street in the city of Norwich, Chenango County, New York. The Project Site is bordered by a shopping plaza to the north, an active NYSEG substation and residential properties to the east, Lackawanna railroad tracks to the west and by residential properties to the south. The Off-Site Target Area extends south of the former Aero Products property beyond Front Street. .
- UU. Project Superintendent:** The Contractor's Project Superintendent described in Specifications Section 01310.
- VV. Record Documents:** The Record Documents and reports described in Specifications Section 01320.
- WW. Remediation:** Activities performed by the Contractor or Others to remove or mitigate the environmental effects of residuals and other hazardous substances present in site soil, groundwater, or surface water.
- XX. Request for Information (RFI):** A written notice by Contractor to receive clarification, direction, or explanation from the Engineer regarding the Work.
- YY. Samples:** Physical examples of material, equipment, or Workmanship that are representative of some portion of the Work, and which establish the standards by which such portion of the Work will be evaluated.
- ZZ. Schedule of Values:** The Schedule of Values as defined in paragraph 1.02(A) of Section 01290 of the Specifications.



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## SECTION 01110

### SUMMARY OF WORK

- AAA. Secured Zone:** The area(s) within which Contractor shall perform the Work and where Contractor has primary responsibility for operation, security, and safety of materials, equipment, and personnel.
- BBB. Site Construction Manager:** The authorized representative of the Engineer who may be assigned to the Project Site or any part thereof.
- CCC. Specifications:** Those portions of the Contract Documents consisting of written technical descriptions of materials, equipment, standards, workmanship, measurement, and payment as applied to the Work and certain administrative details, applicable thereto.
- DDD. SSHO:** The Contractor's Site Safety and Health Officer described in Specifications Section 01415.
- EEE. Subcontractor:** An individual, firm, or corporation having a direct contract with the Contractor or with any other Subcontractor for performance of a part of the Work.
- FFF. Submittals:** The Submittals described in the Specifications including, but not limited to, Section 01330 of the Specifications.
- GGG. Substantial Completion:** Substantial Completion shall mean all on-site Work is complete except for demobilization, contract closeout, and ongoing maintenance activities described in the Contract Documents. The terms "substantially complete" and "substantially completed" as applied to all or part of the Work refer to Substantial Completion thereof.
- HHH. Successful Bidder:** The Bidder to whom the Owner awards the Contract for the Work.
- III. Supplier:** A manufacturer, fabricator, distributor, or vendor having a direct Contract with Contractor or with any Sub-Contractor to furnish materials or equipment to be incorporated in the Work by Contractor or any Sub-Contractor.
- JJJ. Support Zone:** Designated area within the Secured Zone that contains no Impacted Materials or construction hazards.
- KKK. T&M:** Time and materials.
- LLL. Technical Execution Plan:** A written Work plan, submitted by Bidder in accordance with the requirements of the Bidding Documents, and subsequently modified by



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## SECTION 01110

### SUMMARY OF WORK

Contractor in accordance with the Contract Documents, that describes methods, materials, and sequences of specific Work items.

**MMM. Underground Facilities:** All pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels or other such facilities or attachments, and any encasements containing such facilities that have been installed underground

**NNN. Weekly Progress Meetings:** The Weekly Progress Meeting referred to in Specifications Section 01310.

**OOO. Work:** The entire completed construction and the various separately identifiable parts thereof required to be furnished under the Contract Documents. Work includes and is the result of performing or furnishing labor and furnishing and incorporating materials and equipment into the construction, performing or furnishing services or transportation, performing treatment, and furnishing documents, all as required by the Contract Documents.

**PPP. Work Change Directive:** The Work Change Directive described in Specifications Section 01250.

**QQQ. Work Zones:** Areas of the site where Work is conducted. Work zones include, but are not limited to, the Decontamination Zone, Exclusion Zone, Secured Zone, and Support Zone.

### 1.03. EXISTING CONDITIONS:

- A. The location of the Project Site is shown on the Drawings.
- B. The existing surface layout of the Project Site is shown on the Drawings.
- C. Utilities and Facilities shown or indicated:
  - 1. The information and data shown or indicated on the Drawings with respect to existing utilities and facilities at or contiguous to the Project Site are based on information and data furnished to the Owner or the Engineer by the Owners of such utilities or facilities or by Others.
  - 2. The Owner and the Engineer shall not be responsible for the accuracy or completeness of any such information or data relating to utilities or facilities. Contractor is required to verify all locations prior to subsurface Work.

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## SECTION 01110

### SUMMARY OF WORK

3. The cost of all of the following shall be included in the Contract Price and the Contractor shall have full responsibility for:
  - a. Reviewing and checking all information and data regarding existing conditions.
  - b. Locating all existing utilities and facilities.
  - c. Coordination of the Work with the Owners of existing utilities and facilities during construction.
  - d. The safety and protection of all existing utilities and facilities designated to be protected on the Drawings, and repairing any damage resulting from the Work.

**D. Environmental Conditions:**

1. Subsurface soils and groundwater in some portions of the site are impacted with MGP residuals. For that reason, the Work is subject to the requirements for hazardous waste operations specified in Federal Occupational Safety and Health regulation 29 CFR 1910.120.

#### 1.04. PROJECT SUMMARY:

- A.** The Project includes Work required to excavate Impacted Soil and subsurface structures, perform In-Situ Solidification, transport Impacted Materials to an off-site permitted treatment/disposal facility, and site restoration. Specific details include:
1. Mobilization of crew, facilities, equipment and materials required to complete the Work.
  2. Complete site preparation activities including the construction of decontamination facilities, stockpile areas and the installation of erosion and sediment controls.
  3. Remove structural overburden in excavation area and stockpile for re-use as ISS working platform material. Working platform material shall be incorporated into the ISS soils.
  4. Perform excavation to the grades shown on the drawings.

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## SECTION 01110

### SUMMARY OF WORK

5. Transport and dispose of impacted soils and debris at Owner approved disposal facilities.
  6. Perform ISS using a vertical rotary auger within the limits as shown on the drawings.
  7. Backfill and grade site to the elevations shown on the drawings.
  8. Place topsoil as shown on the drawings and seed all disturbed areas.
  9. Clean site and demobilize all construction equipment, facilities and materials.
- B.** Details of the scopes of individual pay items are described in Specifications Section 01270 – Measurement and Payment.

#### 1.05. WORK BY OTHERS:

- A.** Removal of existing overhead signal wiring as shown in the drawings.
- B.** Installation of underground wiring associated with the NYS&W Railway.
- C.** The following Site Preparation activities required to implement the Work will be completed by Others prior to the Contractor's mobilization to the site:
- D.** Abandonment of monitoring wells per the NYSDEC regulations.
- E.** Provision and installation of chain-link fencing and gates as shown on the Drawings. The Contractor shall install and remove temporary fencing as shown on the drawings. The following Site Preparation activities required to implement the Work will be completed by Others prior to the Contractor's mobilization to the site:
  1. Provision and installation of chain-link fencing and gates as shown on the Drawings. The Contractor shall install and remove temporary fencing as shown on the drawings.

#### 1.06. WORK SEQUENCE:

- A.** The Work shall begin in 2016; substantial completion in 2017.

## PART 2 – PRODUCTS

Contract Modification Procedures	July 11, 2016	01250
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**SECTION 01110**

**SUMMARY OF WORK**

Not used.

**PART 3 – EXECUTION**

Not used.

**END OF SECTION**

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**SECTION 01140**  
**WORK RESTRICTIONS****PART 1 – GENERAL****1.01 SECTION INCLUDES:**

- A. Contractor's Use of Premises
- B. Access Roads
- C. Parking
- D. Work Hours
- E. Impacted Material Control.
- F. Restrictions on Noise, Dust, and Odor Emissions
- G. Restrictions on Air Emissions of Toxic Chemicals
- H. Protection of Existing Utilities

**1.02 CONTRACTOR'S USE OF PREMISES:**

- A. Contractor shall confine all operations, including the storage of materials, to the designated areas of the Project Site as shown in the Drawings, or as otherwise approved in writing by the Engineer. Contractor shall be responsible for arranging for, and paying the costs of, any necessary off-site storage. Any further use of the Project Site must be approved in writing by the Engineer.
- B. Storage of all materials will be limited to the Project site and the Stockpile and Staging Area.
- C. No Impacted Materials shall be stored in vehicles or stockpiled outside of the Project Site.
- D. No Impacted Materials shall be stored in the Stockpile and Staging Area.
- E. Contractor's use of the premises shall be limited to the Work being performed under the Specifications and Drawings.
- F. The Owner shall execute access agreements to obtain permission to complete any Work that is to be conducted on properties not owned by the Owner. Contractor shall not occupy, cross, or otherwise use any of the properties not owned by the Owner until such access agreements have been executed, and the Engineer has provided written notice to the Contractor that access is permitted.
- G. Contractor shall be responsible for the security and safety of Contractor's equipment and facilities. Owner and the Engineer shall not be liable for loss or damage of Contractor's tools, vehicles, equipment, or materials, whatever the cause. Such loss or damage shall not be sufficient reason for changes in the Project Schedule.

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**SECTION 01140**  
**WORK RESTRICTIONS**

- H. Contractor shall be responsible for any damage to roadways, facilities, utilities, trees, or structures on, or adjacent to, the Project Site due to negligence, carelessness, actions, errors, or omissions on the part of the Contractor.

**1.03 ACCESS ROADS:**

- A. Contractor vehicles shall enter and exit the Project Site only at the locations designated on the Drawings or as otherwise approved in writing by the Engineer.
- B. Contractor shall be responsible for obtaining any permits and paying any fees necessary for Contractor's use of public streets or roads.
- C. Contractor shall abide by the Off-site Transportation and Disposal Plan, in accordance with local, state, and federal regulations, including, but not limited to, any flaggers and signage for impeded traffic flow on public streets.
- D. Contractor shall, at all times, provide for unimpeded access for emergency vehicles to the Project Site and nearby properties.

**1.04 PARKING:**

- A. Contractor shall park construction vehicles and construction equipment only in areas designated for such purpose and not outside the Project Site.
- B. Contractor employees shall park personal vehicles only in an employee parking area as designated by the Contractor's TEP.
- C. Vehicles shall not be parked in any locations where they impede traffic or access to areas where Work is being conducted.

**1.05 WORK HOURS:**

- A. Normal Work Hours shall be in accordance with the City of Norwich requirements, or as otherwise approved in advance by the Engineer and City of Norwich Officials, and subject to availability of adequate daylight to safely perform the Work. Contractor shall submit a Staffing Plan detailing Work hours and shift requirements as part of the Technical Execution Plan.
- B. Work hours established by any ordinance, Law, or Regulation shall supersede the requirements of this Specifications Section.
- C. Contractor shall conduct all Work between sunrise and sunset when there is adequate light so that the Work can be conducted safely and the Engineer can effectively observe

Work Restrictions	July 11, 2016	01140
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**SECTION 01140**  
**WORK RESTRICTIONS**

the Work. Alternatively, the Contractor shall furnish adequate lighting for activities conducted between sunset and sunrise, as defined by OSHA regulation and as approved by the Engineer. Contractor shall provide adequate lighting at all times, including as deemed necessary by the Engineer, OSHA, and/or NYSDOT Regulations.

- D. Contractor may conduct regular equipment maintenance during hours outside of the Normal Work Hours defined in this Section, with prior approval from the Engineer for such activities.
- E. Contractor personnel shall not work on the Project Site alone.
- F. Any variation from Normal Work Hours or work on Sundays or Holidays shall be subject to approval by the Engineer and Owner. Any request for change must be made to the Engineer no less than 48 hours in advance.
- G. Emergency repairs of equipment outside of Normal Work Hours may be performed without 48-hour notice, but Contractor shall verbally notify the Engineer prior to such emergency maintenance.

**1.06 IMPACTED MATERIAL CONTROL**

- A. Contractor shall manage the Work to ensure that impacted materials (soil, water, groundwater, ISS spoils, and any other impacted materials) are not discharged from the Project Site to the surrounding streets or properties.

**1.07 RESTRICTIONS ON NOISE, DUST, AND ODOR EMISSIONS:**

- A. Contractor is responsible for conducting all Work in accordance with Laws and Regulations concerning noise or sound levels.
- B. Contractor is responsible for conducting all Work in accordance with Laws and Regulations concerning airborne dust emissions, including the CAMP, and the site-specific Health and Safety Plan (HASP).
- C. Contractor is responsible for conducting all Work in accordance with Laws and Regulations concerning odor emissions, including the CAMP, and the HASP.
- D. Contractor shall control the Work at all times such that noise, dust, and odor measurements do not exceed the Action Levels set forth in the CAMP, and the HASP. A copy of the CAMP is provided in the Contract Documents.
- E. The Engineer shall have authority to direct Contractor to stop Work or modify Work methods or activities as necessary to enforce compliance with the Air Monitoring Action

Work Restrictions	July 11, 2016	01140
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## **SECTION 01140 WORK RESTRICTIONS**

Levels, or if the Engineer deems odor emissions, noise or sound levels, or dust emissions are exceeded.

### **1.08 RESTRICTIONS ON AIR EMISSIONS OF TOXIC CHEMICALS:**

- A. Contractor shall be responsible for conducting all Work in accordance with Laws and Regulations concerning airborne emissions of toxic chemicals including the CAMP, and the HASP.
- B. Contractor shall control the Work at all times such that concentrations of airborne constituents measured at the Project Site fence line are below the Action Levels set forth in the Air Monitoring Plans including the CAMP, and the HASP.
- C. The Engineer shall have authority to direct the Contractor to stop Work or modify Work methods or activities as necessary to enforce compliance with the Action Levels for airborne emissions of toxic chemicals or to address odor complaints and/or any other third party complaints or issues.

### **1.09 PROTECTION OF EXISTING UTILITIES:**

- A. Contractor shall contact and cooperate with utility companies to locate all utilities (including pipelines, cables, power poles, guy wires, and other structures) on the Project Site prior to beginning the Work.
- B. Contractor shall comply with the requirements of specific utility protection Laws or Regulations.
- C. All utilities shall be protected from damage during construction, unless otherwise indicated to be removed or abandoned. If damaged, the utilities shall be repaired as required by the utility's Owner at the Contractor's expense.
- D. If a utility is encountered that is not shown on the Drawings or otherwise made known to the Contractor prior to beginning the Work, the Contractor shall promptly take necessary steps to assure that the utility is not damaged, and give written notice to the Engineer. The Engineer shall then review the conditions and determine the extent, if any, to which a change is required in the Contract Documents to reflect and document the consequences of the existence of the utility.

## **PART 2 – PRODUCTS**

Not used.

Work Restrictions	July 11, 2016	01140
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**SECTION 01140**  
**WORK RESTRICTIONS**

**PART 3 – EXECUTION**

Not used.

**END OF SECTION**



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**SECTION 01250**  
**CONTRACT MODIFICATION PROCEDURES**

**PART 1 - GENERAL**

**1.01 SECTION INCLUDES:**

- A. Submittals
- B. Procedures for Changes in the Work
- C. Contractor Request for Change in Contract Price or Contract Time
- D. Correlation of Contractor Submittals
- E. Change Order
- F. Work Change Directive

**1.02 SUBMITTALS:**

- A. Contractor shall submit all documentation and correspondence regarding changes in the Work in accordance with the procedures specified in Section 01330 - Submittal Procedures.

**1.03 PROCEDURES FOR CHANGES IN THE WORK**

- A. The Engineer may at any time make changes in the Drawings, Specifications, and requirements of any Work Order that the Engineer deems necessary, or as directed by Owner. Contractor shall not make any changes to the Drawings or Specifications except upon written order from the Engineer.
- B. Field Order: The Engineer may make minor modifications to the Work, and provide interpretations or clarifications, which do not entail any change to the Contract Price or Contract Times, through the issuance of a Field Order. The Field Order will include the date, name of person issuing it, the relevant Specification or Drawing number, and any additional information necessary for documentation.
- C. Work Change Directive (Form attached to this Section 01250): The Engineer may order an addition, deletion, or revision in the Work, or respond to differing or unforeseen physical conditions under which the Work is to be performed, such as by adding or modifying quantities under established unit price Bid Items, by issuance of a Work Change Directive. The Work Change Directive shall be signed by the Engineer's project manager or Resident Project Representative, the Contractor and by the Owner. The Work Change Directive shall include a description of the change to the Work, including

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**SECTION 01250**  
**CONTRACT MODIFICATION PROCEDURES**

reference to the Specification section(s) and Drawing number(s), the method for measurement of the Work covered by the unit price, and an estimate of the expected resulting change to the Contract Price and Contract Time.

- D. Change Order (form attached to this Section 01250): A Change Order will be executed for any necessary change to the Work that Contractor will perform on the basis of a unit price or lump sum price for a new work item that is not included on the bid form Schedule A. The Schedule of Values shall be modified by issuance of a Change Order. The Change Order shall be signed by the Engineer's project manager or Resident Project Representative, the Contractor and by the Owner, and shall include a description of the change to the Work including reference to the Specifications section and Drawing number, the new unit price, the method for measurement of the Work covered by the unit price, and an estimate of the expected resulting change to the Contract Price and/or Contract Time.
- E. If a change to the Work involves a deduction from the Work Order amount, not determinable by reference to the Schedule of Values, the Engineer's estimate of same shall be accepted by Contractor if Contractor fails to submit its own estimate within five (5) working days following notice of such proposed change. The amount of such deduction shall, at the Engineer's option, be a lump-sum amount agreed upon between the Engineer and Contractor on the actual cost saved on labor, material, and equipment usage, which would have been necessary for the portion of the Work not performed.
- F. The amount to be allowed to Contractor in excess of the Work Order amount for the performance of additional work, unless being accomplished on a Time and Materials (T&M) or Cost Plus Percentage (CP) basis or determined upon reference to an applicable unit price, shall be at a lump sum agreed upon between parties.
- G. In the event the Contractor performs any Work on a T&M basis, or cost plus a percentage basis, Contractor shall submit supporting documentation prior to the application for payment.
- H. Contractor agrees that if the Engineer is not satisfied with the price quoted by Contractor, for any change in the Work with a value estimated by the Engineer to be more than \$25,000, the Engineer may engage another Contractor to perform the change in the Work.
- I. If the Engineer and Contractor are not able to agree as to the amount, either of money or time, to be allowed or deducted for any changes in the Drawings, Specifications or requirements for the Work or any Work Order, it shall, nevertheless, be the duty of the Contractor, upon written notice from the Engineer, to proceed immediately with the changes and continue the work as directed by the Engineer.



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**SECTION 01250**  
**CONTRACT MODIFICATION PROCEDURES**

**1.04 CONTRACTOR REQUEST FOR CHANGE IN CONTRACT PRICE OR CONTRACT TIME:**

- A. Contractor shall maintain detailed records of Work done on the basis of T&M. Contractor shall include with the Daily Construction Report itemizing T&M Work for verification and approval by the Engineer each day that Contractor performs Work on the basis of T&M.
- B. Contractor shall document each request for a change in cost or time with sufficient data to allow the Engineer's evaluation of the request, and if deemed necessary by the Engineer, Contractor shall provide the following types of additional data to support computations:
  - 1. Quantities of products, labor, and equipment
  - 2. Taxes, where applicable
  - 3. Overhead and profit
  - 4. Justification for any change in Contract Time
- C. Contractor shall support each claim for additional costs with the following additional information for verification by the Engineer:
  - 1. Origin and date of claim
  - 2. Dates and times work was performed, and by whom
  - 3. Time records for labor and equipment solely applicable to claim
  - 4. Invoices and receipts for products, equipment, and sub-subcontracts, similarly documented

**PART 2 - PRODUCTS**

Not used.



**SECTION 01250**  
**CONTRACT MODIFICATION PROCEDURES**

**PART 3 - EXECUTION**

**3.01 CORRELATION OF CONTRACTOR SUBMITTALS:**

- A. Contractor shall promptly revise the Schedule of Values and Application for Payment forms to record each authorized Work Change Directive or Change Order as a separate line item and adjust the Contract Price.
- B. Contractor shall promptly revise progress schedules to reflect any change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.
- C. Contractor shall promptly enter changes in Project Record Documents.

**END OF SECTION**

**Work Change Directive and Change Order Forms Follow**

**WORK CHANGE DIRECTIVE****No.** \_\_\_\_\_

DATE OF ISSUANCE: \_\_\_\_\_

EFFECTIVE DATE: \_\_\_\_\_

OWNER: NEW YORK STATE ELECTRIC & GAS CORP.

ENGINEER: \_\_\_\_\_

SUBCONTRACTOR: \_\_\_\_\_

Contract / Work Order: \_\_\_\_\_

Name of Site: \_\_\_\_\_ Project No. \_\_\_\_\_

You are directed to proceed with the following changes to the Work:

Description:

Purpose for Work Change Directive:

Attachments:

If Engineer or Contractor believe that the above change has affected Contract Price, any Claim for a Change Order based thereon will involve one or more of the following methods as defined in the Construction Subagreement Documents:

\_\_\_\_ Unit Prices

\_\_\_\_ Lump Sum \$ \_\_\_\_\_

\_\_\_\_ Cost of the Work

Estimated increase (decrease) in Contract Price:

\$ \_\_\_\_\_.

If the change involves an increase, the estimated amount is not to be exceeded without further authorization.

Estimated increase (decrease) in Contract Times:

Substantial Completion: \_\_\_\_\_ days;

Ready for final payment: \_\_\_\_\_ days.

RECOMMENDED:

ACCEPTED:

APPROVED:

By: \_\_\_\_\_  
Engineer's RepresentativeBy: \_\_\_\_\_  
CONTRACTORBy: \_\_\_\_\_  
NYSEG

Date: \_\_\_\_\_

Date: \_\_\_\_\_

Date: \_\_\_\_\_



## CHANGE ORDER

No. \_\_\_\_\_

DATE OF ISSUANCE: \_\_\_\_\_

EFFECTIVE DATE: \_\_\_\_\_

OWNER: NEW YORK STATE ELECTRIC &amp; GAS CORP.

ENGINEER: \_\_\_\_\_

CONTRACTOR: \_\_\_\_\_

Contract / Work Order: \_\_\_\_\_

Name of Site: \_\_\_\_\_

Project No. \_\_\_\_\_

You are directed to make the following changes to the Construction Subagreement Documents:

Reasons for Change Order:

Attachments:

CHANGE IN CONTRACT PRICE	CHANGE IN CONTRACT TIMES
Original Contract Price \$ _____	Date for Substantial Completion: _____
Net Increase (Decrease) from previous Change Orders No. ____ to ____ : \$ _____	Date for Completion and Readiness for Final Payment: _____
Contract Price prior to this Change Order: \$ _____	
Net increase (decrease) of this Change Order: \$ _____	
Contract Price with all approved Change Orders: \$ _____	

RECOMMENDED:

ACCEPTED:

APPROVED:

By: \_\_\_\_\_  
Engineer's Representative

By: \_\_\_\_\_  
CONTRACTOR

By: \_\_\_\_\_  
NYSEG

Date: \_\_\_\_\_

Date: \_\_\_\_\_

Date: \_\_\_\_\_

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**SECTION 01270**  
**MEASUREMENT AND PAYMENT****PART 1 – GENERAL****1.01 SECTION INCLUDES:**

- A. Quantity Estimates
- B. Payment
- C. Measurement of Quantities
- D. Assessment of Non-Conforming Work
- E. Eliminated Items
- F. Application for Payment
- G. Measurement and Payment of Bid Items

**1.02 QUANTITY ESTIMATES:**

- A. For all Unit Price Work, the Contract Price will include an amount equal to the sum of the unit price for each pay item times the estimated quantity of each item as indicated in the Bid Form. The estimated quantities shown on Bid Form Schedule A are not guaranteed and are solely for the purpose of comparison of bids and determining an initial Contract Price. Quantities and measurements supplied or placed in the Work in accordance with the Specifications and Drawings and verified by the Engineer will determine payment.
- B. The Engineer will determine the actual quantities and classifications of Unit Price Work performed by the Contractor. The Engineer will review with the Contractor the Engineer's preliminary determinations before rendering a written decision on an Application for Payment.
- C. If the actual Work requires more or fewer units than the estimated units indicated on Bid Form Schedule A, Contractor shall provide the required units at the unit prices contracted. Under no circumstances may Contractor exceed stated quantities without prior written approval from the Engineer.

**1.03 PAYMENT:**

- A. Payment includes: Full compensation for all required labor, products, tools, equipment, plant, transportation, services, and incidentals; erection, application, or installation of an item of the Work, including overhead and profit.
- B. Payment will not be made for any of the following:
  - 1. Products wasted or disposed of in a manner that is not acceptable.
  - 2. Products determined as unacceptable before or after placement.
  - 3. Products not completely unloaded from the transporting vehicle.

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**SECTION 01270**  
**MEASUREMENT AND PAYMENT**

4. Products placed beyond the lines and levels of the required work.
  5. Loading, hauling, and disposing of rejected materials.
  6. Products remaining on hand after completion of work.
  7. Additional work undertaken to expedite Contractor's operations.
  8. Repair or replacement of monitoring wells, utilities, or any other facilities located within or adjacent to the Work Area.
- C. Payment will be made by the Owner for all Work actually performed during a particular payment period. Payments for lump sum items will be made based on the percent completion of the pay item. Upon approval by the Engineer, judgments of percent completion of lump sum items will be made in reference to the Schedule of Quantities and Prices

**1.04 MEASUREMENT OF QUANTITIES:****A. Measurement by Weight:**

1. Weigh Scales: Scales shall be certified in accordance with applicable laws and regulations for the state and county in which the scales are located. Certification shall have been made within a period of not more than one year prior to date of use for weighing commodity.
2. The term "ton" will mean the short ton consisting of 2,000 pounds.
3. For shipments to offsite waste management facilities and locations, trucks will be weighed at the receiving facility for the purpose of measuring the quantity of Work for payment.

**B. Measurement by Volume:**

1. Volumes measured as in-place volumes will be determined by survey approved by the Engineer. The Contractor shall retain the services of an independent land surveyor, licensed or registered in the State of New York, whose determination of in-place volumes shall be authoritative and final for the purpose of measurement for payment. To compute in-place volumes of excavation, the average end area method or other methods acceptable to the Engineer will be used.

**C. Measurement by Area: Measured by square dimension using length and width or radius, and verified by the Engineer.**

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**SECTION 01270**  
**MEASUREMENT AND PAYMENT**

- D.** Linear Measurement: Measured by linear dimension, at the item centerline or mean chord, and verified by the Engineer.
- E.** Measurement by Time: Measure by the actual time rounded to the nearest time unit and verified by the Engineer.

**1.05 ASSESSMENT OF NON-CONFORMING WORK:**

- A.** Contractor shall replace Work, or portions of the Work, that do not conform to the requirements of the Specifications and Drawings, as assessed by the Engineer.
- B.** If, in the opinion of the Engineer, it is not practical to remove and replace the non-conforming Work, the Engineer will direct one of the following remedies:
  - 1.** The non-conforming Work may remain, but the unit price will be adjusted to a new price at the discretion of the Engineer.
  - 2.** The non-conforming Work shall be partially repaired to the instructions of the Engineer, and the unit price will be adjusted to a new price at the discretion of the Engineer.
- C.** The individual Specification sections may modify these options or may identify a specific formula or percentage price reduction.
- D.** The authority of the Engineer to assess non-conforming work and identify payment adjustment is final.

**1.06 ELIMINATED ITEMS:**

- A.** Should any items contained in the Drawings or Specifications be found unnecessary for the proper completion of the Work, the Engineer may, upon written order to the Contractor, eliminate such items from the Work, and such action shall in no way invalidate the Agreement.
- B.** Contractor will be paid for actual Work done and all documented costs incurred, including mobilization of materials prior to elimination of such items.

**1.07 APPLICATION FOR PAYMENT:**

- A.** Contractor shall submit Applications for Payment as specified in Specifications Section 01290 – Payment Procedures.

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**SECTION 01270**  
**MEASUREMENT AND PAYMENT****1.08 MEASUREMENT AND PAYMENT OF BID ITEMS:**

- A.** Bid Form Schedule A, Schedule of Values, lists the Bid Items and Unit Price Items for the Work. Measurement and payment of the Work covered by the Contract Documents is specified herein below.
- B.** At the direction of the Engineer, Contractor may be asked to perform change order work on a T&M basis. Schedule E – List of Equipment, and Schedule G – List of Personnel, shall be the basis for measurement and payment of equipment and labor for Time and Materials Work. Hourly prices for equipment and labor listed on Schedule E and Schedule G shall include Contractor's overhead and profit for such Time and Materials Work.
- C.** The following paragraphs specify measurement and payment of the Bid items listed on Bid Form Schedule A (attached to this Specification Package):

**Bid Item 1 Mobilization and Demobilization**

- 1.** Work required to complete Mobilization and Demobilization includes, but is not limited to:
  - a.** Movement of personnel, equipment, and materials to the site, if such movement is not included in any other Bid Item.
  - b.** Preconstruction coordination meetings.
  - c.** Preparation, submittal, and revision of all required pre-mobilization submittals as described in Specifications Section 01330 – Submittal Procedures.
  - d.** Removal of all personnel, equipment, and materials from the Site at the completion of the Work.
- 2.** Mobilization and Demobilization will be measured for payment monthly, complete as specified.
- 3.** Payment for Mobilization and Demobilization Work will be made on a monthly basis unit price as listed on Bid Form Schedule A. Payment for "Mobilization and Demobilization" shall constitute full compensation for all labor, supervision, materials, equipment, start up submittals, incidentals and all other costs necessary to complete Mobilization and Demobilization Work, including the transport of all equipment, labor and temporary facilities and materials to and from the Site. No more than 70% of this bid item may be invoiced prior to demobilization from the site as substantial completion.

**Bid Item 2 Temporary Facilities and Controls**

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**SECTION 01270**  
**MEASUREMENT AND PAYMENT**

1. Work required to complete the Temporary Facilities and Controls includes, but is not limited to:
  - a. Implement requirements for environmental protection specified in Specifications Section 01140 – Work Restrictions unless specifically identified as being provided by others.
  - b. Provide and maintain temporary fencing and visual barrier fabric as shown on the Drawings.
  - c. Provide and maintain a Rusmar foam unit of sufficient size to cover the impacted areas within 5 minutes (or equivalent) on Project Site for the duration of intrusive operations. Foam expendables will be paid under alternate bid item 13.
  - d. Provide and maintain power-sprayer units of sufficient size to provide continuous Biosolve®-solution misting over active excavations on Project Site for the duration of intrusive operations. Biosolve® expendables will be paid under alternate bid item 14.
  - e. Provide and maintain Piiian odor neutralizer system of sufficient size to provide continuous perimeter odor control on Project Site for the duration of intrusive operations. Piiian system expendables will be paid under alternate bid item 15.
  - f. Implement health and safety requirements specified in Specifications Section 01415 – Health and Safety Requirements.
  - g. Install and maintain temporary facilities and controls specified in Specifications Section 01500 – Mobilization and Temporary Facilities unless specifically identified as being provided by Others.
  - h. Implement and maintain temporary erosion and sediment controls shown on the Drawings and/or specified in Specifications Section 01570 – Erosion and Sediment Controls.
  - i. Cost to provide project management and oversight as specified in Specifications Section 01310 – Project Management and Coordination.
  - j. Install decontamination facilities specified in the Drawings and in Specifications Section 02130 - Decontamination and management and disposal of any liquids or residues generated during decontamination.
  - k. Maintain and repair of all temporary facilities and controls including those provided by Others during the period when Work is taking place at the site. **Installation of temporary haul roads, stockpile and water treatment pads and restoration of same shall be included.**
  - l. Conduct any surveying needed to control and document the Work.

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### MEASUREMENT AND PAYMENT

- m.** Provide general support to the Engineer for completion of all Site work including, but not limited to, placement, access, movement, and collection of information associated with air, noise, vibration, settlement, and odor.
    - n.** All other one-time and recurring activities required by the Contractor to complete the Work unless included in another pay item or specifically identified as being the responsibility of Others.
  - 2.** Temporary Facilities and Controls Work will be measured for payment monthly, complete as specified.
  - 3.** Payment for Temporary Facilities and Controls Work will be made on a monthly basis unit price as listed on Bid Form Schedule A. Payment for “Temporary Facilities and Controls” shall constitute full compensation for all labor, supervision, materials, equipment, incidentals and all other costs necessary to complete Temporary Facilities and Controls Work.

**Bid Item 3**      Top of ISS Monolith Pre-Cut Excavation

- 1.** Work required to complete Top of ISS Monolith Pre-Cut Excavation, Stockpiling, and Loading work includes, but is not limited to:

  - a.** Excavation, stockpiling and loading of soils within the limits of the Top of ISS Monolith Pre-Cut as defined in the Drawings.
  - b.** Managing, handling, transportation and stockpiling of soils free of visible tar oil, sheens or odors for sampling and possible reuse onsite as backfill to the offsite Stockpile and Staging Area as required in Specifications Section 01110 – Summary of Work.
  - c.** Managing, handling, transportation, and stockpiling of impacted soils including soils encountered with visible oil, sheens, odors, and that which is determined to not meet reuse criteria onsite within the limits shown in the Drawings.
- 2.** Excavation, Stockpiling, and Loading Work will be measured for payment on an in-place cubic yard basis as verified by survey of excavation bottom.
- 3.** Payment for Excavation, Stockpiling, and Loading Work will be made in accordance with the unit price listed on Bid Form Schedule A. Payment of the unit price for “Top of ISS Monolith Pre-Cut Excavation” shall constitute full compensation for all labor, supervision, materials, equipment, incidentals and all other costs necessary to complete Excavation work as specified in Specifications Section 02260 and as indicated on the Drawings. Payment will only be made for soil excavated within the horizontal and vertical limits of excavation shown on the Drawings.

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**SECTION 01270**  
**MEASUREMENT AND PAYMENT****Bid Item 4** ISS Treatment

1. Work required to complete ISS Treatment work includes, but is not limited to:
  - a. Providing ISS treatment of soils in order to meet the Performance Criteria as described in Section 02196 – In-Situ Solidification – Auger Mixed and in the Drawings.
2. ISS Treatment Work will be measured for payment on an in-place cubic yard basis as verified by survey of bottom elevation of installed ISS columns. ISS column volume will be as defined in the Contractor's approved TEP based on column location, Top Elevation for ISS Treatment at column location, bottom elevation of installed column, and installed diameter. Required column overlap(s) will not be included in the volume calculation for this pay item.
3. Payment for ISS Treatment Work will be made in accordance with the unit price listed on Bid Form Schedule A. Payment of the unit price for "ISS Treatment" shall constitute full compensation for all labor, supervision, materials, equipment, incidentals and all other costs necessary to complete ISS work as specified in Section 02196 – In-Situ Solidification – Auger Mixed, and shall include operation and maintenance of all ISS mixing and grout mixing equipment, ISS Swell/Spoils Management Excavation, swell handling management including the amendment of soils for moisture reduction as directed by the Engineer, and Trucking & Disposal, providing all reagents not specifically identified as being provided by others, and quality assurance/quality control measures.
4. NYSEG will not be responsible for the costs of any changes in the ISS approach and associated operational work resulting from any work approach not defined in the design documents or approved contract modifications.

**Bid Item 5** Construction Water Management

1. Work required to complete Construction Water Management includes, but is not limited to set-up, relocation (if necessary) and operation of dewatering and construction water control, transmission, storage equipment, and transportation and disposal at a NYSEG approved facility.
2. Construction Water Management will be measured for payment as one unit, as specified.
3. Payment for Construction Water Management will be made on a percent complete basis of the lump sum price listed on Bid Form Schedule A. Payment shall constitute full compensation for all labor, supervision, materials, equipment, incidentals and all other costs necessary to complete dewatering as specified in Specifications Section 02240 – Dewatering.



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**SECTION 01270**  
**MEASUREMENT AND PAYMENT****Bid Item 6** Transportation and Disposal: Contaminated Debris

1. Work required to complete Transportation and Disposal: Contaminated Debris includes but is not limited to: truck preparation for transport, transportation, and final disposal of excavated impacted debris at approved facility.
2. Transportation and Disposal: Contaminated Debris Work will be measured for payment on a per ton basis, as documented by scale weight tickets.
3. Payment for Transportation and Disposal: Contaminated Debris Work will be made in accordance with the unit price listed on Bid Form Schedule A. Payment of the unit price for "Transportation and Disposal: Contaminated Debris" shall constitute full compensation for all labor, supervision, materials, equipment, incidentals, approved disposal facility fees and all other costs necessary to complete Transportation and Disposal: Contaminated Debris Work, as specified in Specifications Section 02120 – Off-site Transportation and Disposal. The debris disposal facilities shall be Seneca Meadows, Inc. (see Bid Item 8).

**Bid Item 7** Transportation and Disposal: Conditionally Exempt Non-Hazardous Waste (Transportation and Disposal: CENW)

1. Work required to complete Transportation and Disposal: CENW includes but is not limited to: truck preparation for transport, transportation, and final disposal of excavated impacted debris at approved facility.
2. Transportation and Disposal: Debris Work will be measured for payment on a per ton basis, as documented by scale weight tickets.
3. Payment for Transportation and Disposal: CENW Work will be made in accordance with the unit price listed on Bid Form Schedule A. Payment of the unit price for "Transportation and Disposal: CENW" shall constitute full compensation for all labor, supervision, materials, equipment, incidentals, approved disposal facility fees and all other costs necessary to complete Transportation and Disposal: CENW Work, as specified in Specifications Section 02120 – Off-site Transportation and Disposal. CENW shall only be disposed of to Environmental Soil Management, Inc.

**Bid Item 8** Transportation and Disposal: Impacted Soil

1. Work required to complete Transportation and Disposal: Impacted Soil includes but is not limited to: truck preparation for transport, transportation, and final disposal of excavated impacted debris at approved facility.
2. Transportation and Disposal: Impacted Soil Work will be measured for payment on a per ton basis, as documented by scale weight tickets.

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3. Payment for Transportation and Disposal: Impacted Soil Work will be made in accordance with the unit price listed on Bid Form Schedule A. Payment of the unit price for "Transportation and Disposal: Impacted Soil" shall constitute full compensation for all labor, supervision, materials, equipment, incidentals, approved disposal facility fees and all other costs necessary to complete Transportation and Disposal: Impacted Soil Work, as specified in Specifications Section 02120 – Off-site Transportation and Disposal.
4. The Contractor shall select a disposal facility from the two listed below. The Contractor shall ensure that the selected disposal facility has capacity to accept excavated materials and spoils at a rate sufficient to meet the Construction Milestones listed in Schedule F. If multiple disposal facilities are required to achieve the construction milestones, the bidder shall provide unit costs and percent of the total excavated material and spoils shipped to each facility in their TEP and in Schedule A.
  - a. Environmental Soil Management, Inc., located at 304 Tow Path Road, Fort Edward, NY, 12828.
  - b. Seneca Meadows, Inc., located 1786 Salcman Road, Waterloo, NY, 13165

**Bid Item 9      Restoration: Reuse Soils Backfill**

1. Work required to complete Restoration Reuse Soils Backfill work includes, but is not limited to delivery of approved reuse soils backfill, placement and compaction, and density testing as specified in Specifications Section 02300 – Backfill and Grading.
2. Restoration Reuse Soils Backfill will be measured for payment on an in place cubic yard basis as verified by survey.
3. Payment for Restoration Reuse Soils Backfill, as specified in Specifications Section 02300, will be made in accordance with the unit price for the Bid item "Restoration: Reuse Soils Backfill" listed on Bid Form Schedule A. Payment of the unit price for "Restoration Reuse Soils Backfill" shall constitute full compensation for all labor, supervision, materials, equipment, incidentals and all other costs necessary to furnish, and place Reuse Soils Backfill at the location where the Reuse Soils Backfill will be incorporated into the Work.

**Bid Item 10      Restoration Select Fill**

1. Work required to complete Restoration Select Fill work includes, but is not limited to delivery of approved select fill, placement and compaction, and density testing as specified in Specifications Section 02300 – Backfill and Grading.

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**MEASUREMENT AND PAYMENT**

2. Restoration Select Fill will be measured for payment on an in place cubic yard basis as verified by survey.
3. Payment for Restoration Select Fill, as specified in Specifications Section 02300 – Backfill and Grading, will be made in accordance with the unit price for the Bid item “Restoration Select Fill” listed on Bid Form Schedule A. Payment of the unit price for “Restoration Select Fill” shall constitute full compensation for all labor, supervision, materials, equipment, incidentals and all other costs necessary to furnish, and place common fill at the location where the common fill will be incorporated into the Work.

**Bid Item 11 Restoration Subbase**

1. Work required to complete Restoration Subbase Fill work includes, but is not limited to delivery of approved common fill, placement and compaction, and density testing as specified in Specifications Section 02300 – Backfill and Grading.
2. Restoration Subbase Fill will be measured for payment on an in place cubic yard basis as verified by survey.
3. Payment for Restoration Select Fill, as specified in Specifications Section 02300 – Backfill and Grading, will be made in accordance with the unit price for the Bid item “Restoration Subbase Fill” listed on Bid Form Schedule A. Payment of the unit price for “Restoration Subbase Fill” shall constitute full compensation for all labor, supervision, materials, equipment, incidentals and all other costs necessary to furnish, and place common fill at the location where the common fill will be incorporated into the Work.

**Bid Item 12 Restoration Topsoil**

1. Work required to complete Restoration Topsoil work includes, but is not limited to delivery of approved topsoil material, any necessary analysis, required amendment, and placement as specified in Specifications Section 02300 – Backfill and Grading.
2. Restoration Topsoil will be measured for payment by in place cubic yards based on survey of the final common fill elevation and the final topsoil elevation.
3. Payment for Restoration Topsoil, as specified in Specifications Section 02300 – Backfill and Grading, will be made in accordance with the unit price for the Bid item “Restoration Topsoil” listed on Bid Form Schedule A. Payment of the unit price for “Restoration Topsoil” shall constitute full compensation for all labor, supervision, materials, equipment, incidentals and all other costs necessary to

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furnish, and place topsoil at the location where the topsoil will be incorporated into the Work.

**Bid Item 13** Odor Control Foam System - Operation

1. Odor Control Foam System – Operation will be measured for payment by the gallon of odor suppressant concentrate(s) applied.
2. Payment for Odor Control Foam System – Operation will be made on a per gallon unit price as listed on Bid Form Schedule A. Payment for odor control foam system - operation shall constitute full compensation for all the costs of Odor Control Foam Concentrate and manpower required to apply same.

**Bid Item 14** Odor Control Sprayer System (Biosolve) - Operation

1. Odor Control Sprayer System – Operation will be measured for payment by the gallon of odor suppressant concentrate(s) applied.
2. Payment for Odor Control Sprayer System – Operation will be made on a per gallon unit price as listed on Bid Form Schedule A. Payment for odor control sprayer system - operation shall constitute full compensation for all the costs of Odor Control Sprayer System Concentrate, water and manpower required to apply same. Odor Control Sprayer System Concentrate will be mixed and dispersed in a 3% - 5% concentration as directed by the Manufacturer.

**Bid Item 15** Perimeter Odor Control Sprayer System (Piian) - Operation

1. Perimeter Odor Control Sprayer System – Operation will be measured for payment by the gallon of odor neutralizer concentrate(s) applied.
2. Payment for Perimeter Odor Control Sprayer System – Operation will be made on a per gallon unit price as listed on Bid Form Schedule A. Payment for perimeter odor control sprayer system - operation shall constitute full compensation for all the costs of Odor Control Sprayer System Concentrate, water and manpower required to apply same.

**Bid Item 16** ISS Standby Time - Hour

3. Payment for the Work shall be made on an hourly basis.
4. Payment for ISS Standby Time – Hour will be made on an hourly basis unit price as listed on Bid Form Schedule A. Payment for ISS Standby Time – Hour shall constitute full compensation for cease ISS Work at the direction of the Engineer for reasons not chargeable to the Contractor.

**Bid Item 17** ISS Standby Time - Day

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**SECTION 01270**  
**MEASUREMENT AND PAYMENT**

1. Payment for the Work shall be made on a daily basis.
2. Payment for ISS Standby Time – Day will be made on a daily basis unit price as listed on Bid Form Schedule A. Payment for Excavation Standby Time – Day shall constitute full compensation for cease ISS Work at the direction of the Engineer for reasons not chargeable to the Contractor. The ISS Standby Time – Day pay item assumes that labor will be reassigned and thus labor costs will not be included in this pay item.

**Bid Item 18** New York Susquehanna & Western Railroad (NYS&W) Utility Work

1. New York Susquehanna & Western Railroad (NYS&W) Utility Work will be measured for payment on a percent complete basis of the lump sum price listed on Bid Form Schedule A.
2. Work required to complete New York Susquehanna & Western Railroad (NYS&W) Utility work includes, but is not limited to:
  - a. Removal and disposal of power poles, as indicated on Drawings.
  - b. Temporary relocation of NYS&W railroad signal control building.
  - c. Return NYS&W railroad signal control building, to position indicated on Drawings, upon project completion.
3. Payment for NYS&W ROW Permitting and Construction Requirements shall be made on percent complete basis of the lump sum price listed on Bid Form Schedule A. Payment for NYS&W ROW Permitting and Construction Requirements shall constitute full compensation for permit application, all labor, supervision, materials, equipment, incidentals and all other costs necessary as required by the Design.

**Bid Item 19** New York Susquehanna & Western Railroad (NYS&W) Underground Utility Installation Support

1. New York Susquehanna & Western Railroad (NYS&W) Underground Utility Installation Support Work will be measured for payment based on the length of the trench listed on Bid Form Schedule A.
2. Work required to complete New York Susquehanna & Western Railroad (NYS&W) Underground Utility Installation Support Work includes, but is not limited to excavation of a 2 foot deep by 2 foot wide trench parallel to the railway, backfilling of the trench once underground utility line has been installed



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**SECTION 01270**  
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by Other as outlined in the Drawings, and compaction testing of in place materials as specified in Section 02300 – Backfill and Grading,.

3. Payment for NYS&W Underground Utility Installation Support shall be made in accordance with the unit price listed on Bid Form Schedule A. Payment for NYS&W ROW Permitting and Construction Requirements shall constitute full compensation for all labor, supervision, materials, equipment, incidentals and all other costs necessary to complete NYS&W utility installation between Front Street and Brown Avenue.

**Bid Item 20** Pre/Post Construction Building Survey

1. Pre/Post Building Survey will be measured for payment based on each house that is surveyed as listed on Bid Form Schedule A.
2. Payment for Pre/Post Construction Building Survey will be made in accordance with the unit price for the Bid Item “Pre/Post Construction building Survey listed on Bid Form Schedule A. Payment of the unit price for “Pre/Post Construction Survey” shall constitute full compensation for all labor, equipment, incidentals, and other costs necessary to complete a Pre/Post Construction Survey of all structures on the given property.

**PART 2 – PRODUCTS**

Not used.

**PART 3 – EXECUTION**

Not used.

**END OF SECTION**

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**SECTION 01290**  
**PAYMENT PROCEDURES****PART 1 - GENERAL****1.01 SECTION INCLUDES:**

- A. Format
- B. Submittal Procedures
- C. Applications for Payment
- D. Invoices
- E. Substantiating Data

**1.02 FORMAT:**

- A. The Bid Form Schedule A, Schedule of Quantities and Prices, submitted by the Successful Bidder, as modified by any executed Change Orders, will be the basis of the Bid Form. The Owner may request further breakdown of certain lump sum items to be included in the schedule of values as deemed necessary by the Owner. The Schedule of Values will serve as the basis for progress payments and will be incorporated into a form of Application for Payment as specified herein.
- B. Contractor shall submit one Application for Payment and invoice, covering the Work performed in each calendar month, for each month for the duration of the Work.
- C. Contractor shall submit to the Owner an Application for Payment on the specified forms, and attach a separate invoice, for the Work completed in the calendar month covered by that Application for Payment.
  - 1. Contractor's invoice shall be a separate page, or pages, in a form of Contractor's choosing that includes the specified information. Contractor shall submit a separate invoice to NYSEG for each Work Order.

**1.03 SUBMITTAL PROCEDURES:**

- A. Contractor shall submit original Application for Payment and invoice, and one copy, to the NYSEG Work Order Representative for review.
- B. Payment Period: Submit invoices at intervals not less than 30 days. Submit an invoice for each month no later than the invoice closing date of the following month as set by NYSEG. The schedule of invoice closing dates will be given to the Contractor prior to mobilization.



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**SECTION 01290**  
**PAYMENT PROCEDURES**

- C. Contractor shall prepare a final Application for Payment and invoice as specified in Section - 01770 Closeout Procedures.

**1.04 APPLICATIONS FOR PAYMENT:**

- A. Contractor shall submit each application for payment in a standardized form approved by NYSEG. A completed copy of this form shall be the cover for each invoice.
- B. Applications for Payment shall be executed and certified by signature of authorized officer of Contractor.
- C. Contractor shall list original Work Order amount, and each authorized Change Order and Work Change Directive, listing Change Order or Work Change Directive number and dollar amount.

**1.05 INVOICES:**

- A. Each invoice shall be accompanied by the specified Application for Payment form and shall show the following:
1. The date of the Master Services Agreement
  2. Work Order Number
  3. Work Order Date
  4. NYSEG's Project No.
  5. The name of the NYSEG Representative named on the Work Order ("Work Order Representative")
  6. A description of the Work performed (The description of the Work shall document site location, project code number and detail the actual Work performed and completed).
- B. Invoices that include Work performed on a T&M or CP basis shall be supported with copies of daily time sheets, and Contractor shall attach photocopies of receipts for all materials and expenses claimed as T&M or CP Work. Lack of complete documentation for T&M or CP work will be just cause for refusal by NYSEG to pay such claimed costs, pending submittal of required documentation. All documentation shall be submitted and approved prior to invoice submittal. Contractor shall submit backup copies of all required paperwork that was previously submitted as a part of a daily or weekly submittal.





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**SECTION 01290**  
**PAYMENT PROCEDURES**

**1.06 SUBSTANTIATING DATA:**

- A. NYSEG may request substantiating data for any claimed payment. When NYSEG requires substantiating data, Contractor shall submit, within 30 days, data justifying quantities of Work and dollar amounts in question. NYSEG may conditionally approve any claimed payment pending submittal of acceptable substantiating data; however, unsubstantiated claims for payment will result in withholding of the unsubstantiated amounts from subsequent payment claims.
- B. Contractor shall submit one copy of substantiating data with cover letter for each request for substantiating data. Each submittal of substantiating data shall show Application for Payment number and date, and pay item by number and description.

**PART 2 – PRODUCTS**

Not Used.

**PART 3 – EXECUTION**

Not Used.

**END OF SECTION**



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**SECTION 01310**  
**PROJECT MANAGEMENT AND COORDINATION**

**PART 1 – GENERAL**

**1.01. SECTION INCLUDES:**

- A.** Contractor's Project Superintendent
- B.** Submittals
- C.** Project Meetings
- D.** Coordination – General
- E.** Coordination of Contractor's Work with Work by Others
- F.** Layout of the Work
- G.** Execution

**1.02. CONTRACTOR'S PROJECT SUPERINTENDENT:**

- A.** Contractor shall employ a qualified Project Superintendent for the duration of the Work. The Project Superintendent shall be experienced in excavation of impacted soils, in situ solidification – auger mixed (as required in Specifications Section 02196 – ISS – Auger Mixed), and coordinating truck transportation of soil and debris. Contractor shall employ an adequate Project coordination staff to assist the Project Superintendent in the required control of Subcontractors, obtaining permits and approvals, development of Progress Schedules, and preparation of Submittals.
- B.** Contractor shall not change the Project Superintendent for the duration of the project.
- C.** Any requested changes in critical site personnel shall be requested in writing no sooner than 30 days prior to the anticipated change, and must be approved by the Engineer and Owner.
- D.** The Contractor's Project Superintendent shall be on the Project Site at all times during the Work, including any Work performed by Subcontractors.
- E.** The Project Superintendent shall be responsible for the completion of the Work in accordance with the Drawings and Specifications, and shall perform the following specific duties:
  - 1.** Coordinate the Work of Contractor's labor and equipment, and that of the Subcontractors.
  - 2.** Serve as the Contractor's primary point of communication with the Engineer, Owner, and Others who are responsible for other aspects of the Project.

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**SECTION 01310**  
**PROJECT MANAGEMENT AND COORDINATION**

3. Coordinate the schedule by which the various tasks are completed within the specified Construction Milestones.
4. Participate in regularly scheduled Project meetings with the Regulator, Engineer and Owner.
5. Schedule and conduct meetings with Subcontractors and other concerned parties as necessary to maintain the Project schedule, resolve matters in dispute, and coordinate use of utilities and other resources.
6. Ensure that quality control objectives are met, and that quality control Work is considered in the Project Schedule so as to avoid delays in the Work.
7. Ensure compliance with all Laws and Regulations and permit requirements.

**1.03. SUBMITTALS:**

- A. Contractor shall prepare and transmit the following Submittals, and any other Submittals described in other Sections of the Specifications, in accordance with the procedures of Specifications Section 01330 – Submittal Procedures:
  1. Contractor shall submit Contractor's Daily Construction Report as specified in Specifications Section 01320 – Construction Progress Documentation by 10:00 A.M. the next Working day.
  2. Contractor shall submit Applications for Payment as specified in Specifications Section 01290 – Payment Procedures.
  3. Contractor shall submit quality control reports and data as specified in other Sections of the Specifications.
  4. Contractor shall submit weekly revisions and updates of Progress Schedule as specified in Specifications Section 01320 – Construction Progress Documentation with a detailed 3-week look ahead.
  5. Contractor shall submit weekly health and safety reports, as specified in Specifications Section 01415 – Health and Safety Requirements.

**1.04. PROJECT MEETINGS:**

- A. Weekly Progress Meetings:

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**SECTION 01310**  
**PROJECT MANAGEMENT AND COORDINATION**

1. Contractor shall attend scheduled Weekly Progress Meetings at the Project Site to review progress of the Work, Project Schedule, Submittal status and delivery schedule, contract modifications, health and safety, and other matters. The Engineer shall prepare a meeting agenda in cooperation with the Owner and the Contractor. The Engineer shall preside at meetings. The Engineer shall designate a representative to record minutes to include significant proceedings and decisions, and reproduce and distribute copies of minutes. The Engineer will provide a conference call in procedure for attendees that cannot physically attend the meetings.
  2. Attendees shall include:
    - a. The Owner.
    - b. The Engineer.
    - c. Contractor's Project Superintendent.
    - d. Contractor, Subcontractors, and Suppliers, as appropriate.
    - e. NYSDEC Representative.
    - f. Others as appropriate.
- B. Other meetings shall be scheduled in accordance with the Specifications or as may be required by the Engineer.

**1.05. COORDINATION – GENERAL:**

- A. Contractor shall coordinate scheduling, Submittals, and Work of the various Sections of Specifications to assure an efficient and orderly sequence of interdependent construction elements, with provisions for accommodating Work performed later.
- B. Contractor shall coordinate and schedule Work in cooperation with the Engineer, the Owner, the Owner's Air Monitoring Contractor, local utility companies, and other construction firms that may be conducting related Work at or near the Project Site.
- C. Contractor shall direct all communications regarding the Work directly to the Engineer's Site Construction Manager. Contractor shall not discuss the Work nor take direction from any other contractor, consultant, public official, media representative, or any other person without prior written approval by the Engineer.
- D. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents is absolute. None of the following shall constitute an acceptance of

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**SECTION 01310**  
**PROJECT MANAGEMENT AND COORDINATION**

Work that is not in accordance with these Specifications or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents:

1. Observation by the Engineer.
  2. Recommendation of any progress payment or final payment by the Engineer.
  3. Use or occupancy of the Work or any part thereof by the Engineer or Others.
  4. Any acceptance by the Engineer, or failure to do so.
  5. Any review and approval of a Submittal by the Engineer.
  6. Any inspection, test, or approval by Others.
  7. Any correction of Non-Conforming Work performed by the Engineer or Others.
- E.** Hazard Communication Program: Contractor shall be responsible for coordinating any exchange of Material Safety Data Sheets (MSDS) or other hazard communication information required to be made available to or exchange between or among employees at the site. Contractor shall compile and properly file MSDSs on site for all materials furnished by Contractor or its Subcontractors and Suppliers.

**1.06. COORDINATION OF CONTRACTOR'S WORK WITH WORK BY OTHERS:**

- A. Coordination of Work of Subcontractors:** Contractor shall be responsible for overall coordination of the Work in accordance with the Construction Milestones set forth in Bid Form Schedule F. Contractor shall obtain from its Subcontractors a schedule similar to Contractor's Progress Schedule and shall be responsible for Subcontractors maintaining these schedules and for coordinating any required schedule modifications.
- B. Work by Others:** The Engineer, and others under subcontract to the Engineer and Owner, including the Owner's Air Monitoring Contractor, will be working on the Project Site while the Work is in progress. Contractor shall coordinate and schedule its Work in cooperation with the Engineer's other Contractors, adjacent property owners, City of Norwich, Owner, and the Engineer.
- C.** Contractor shall abide by all requirements of the Transportation Plan and other local or county requirements. Contractor shall obtain any necessary permits or approvals for closure of streets or sidewalks adjacent to the Site. Contractor shall notify the Owner prior to any contact with State, County and local officials.



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**SECTION 01310**  
**PROJECT MANAGEMENT AND COORDINATION**

- D.** Contractor shall abide by all the requirements of the Community Air monitoring Plan and the Odor, Vapor, and Dust Control Plan developed for the Project Site.
- E. Utilities:** Contractor shall coordinate the Work with various utility companies serving the Project Site and shall secure any required permits and approvals. Contractor shall be solely responsible for notifying utility companies prior to commencing any Work, and for response to any emergencies that may arise during the Work. Certain active and inactive utilities may currently be present at the Project Site, the exact location and type of which shall be determined by Contractor without reliance on information provided by the Engineer. Several utilities may currently serve the Project Site or adjacent properties including, but not limited to, the following:
- 1.** Electric
  - 2.** Natural gas (fuel gas)
  - 3.** Water
  - 4.** Sanitary sewer
  - 5.** Storm sewer
  - 6.** Telephone or other communication (fiber optic cable)
- F.** The Contractor shall coordinate waste shipments to off-site waste management facilities as specified in Specifications Section 02120 – Off-site Transportation and Disposal.

**1.07. LAYOUT OF THE WORK:**

- A.** Contractor shall be solely responsible for laying out the Work, including lines and grades, and for the correctness thereof in accordance with the Specifications and Drawings.

**PART 2 – PRODUCTS**

Not used.

**PART 3 – EXECUTION**

**3.01 MODIFICATIONS**

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**SECTION 01310**  
**PROJECT MANAGEMENT AND COORDINATION**

- A. Any material changes to the work, processes, staffing, sequencing, equipment, or materials will require an amendment to the Technical Execution Plan and review and approval by the Engineer.

**END OF SECTION**

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**SECTION 01320**  
**CONSTRUCTION PROGRESS DOCUMENTATION****PART 1 – GENERAL****1.01. SECTION INCLUDES:**

- A. Submittals
- B. Construction Milestones
- C. Progress Schedule
- D. Daily Construction Report
- E. Health and Safety Reports
- F. Record Documents
- G. Progress Schedule Reviews, Acceptance, Updates, and Revisions

**1.02. SUBMITTALS:**

- A. Work and progress payments shall not start without an initial Progress Baseline Schedule reviewed and approved by the Engineer and Owner. The baseline shall not be altered for the duration of the project. Contractor shall submit an initial Baseline Progress Schedule for approval prior to the Notice to Proceed, and shall submit weekly updates of the Progress Schedule comparing progress to the baseline during the Work in accordance with Specifications Section 01330 – Submittal Procedures. The Project name and date of Submittal shall be written on each sheet.
- B. Contractor shall prepare a written Daily Construction Report in a format acceptable to the Engineer. The Daily Construction Report shall be prepared for each day Contractor is on the Project Site and submitted to the Engineer, electronically and in hard copy, no later than 10:00 A.M. the next Working day. See section 1.05 of this specification for additional details
- C. Record Documents, as specified in section 1.07 of this specification.

**1.03. CONSTRUCTION MILESTONES:**

- A. Specific requirements for phasing of the Work are set forth in Bid Form Schedule F, Construction Milestones. The initial Progress Schedule shall be based on progress and completion of the Work within the Construction Milestones and Contract Times listed in Bid Form Schedule F.

**1.04. PROGRESS SCHEDULE:**

- A. The Progress Schedule shall be a bar graph (Gantt chart) showing the proposed order of Work, the expected beginning and completion times for the salient Work features,



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**SECTION 01320**  
**CONSTRUCTION PROGRESS DOCUMENTATION**

predecessor(s) for each item, and the duration of each item. The Progress Schedule shall show each activity and, as a minimum, each activity description shall contain:

1. Activity name and identifying number.
  2. Predecessor(s).
  3. Successor(s).
  4. Activity duration (in calendar days).
  5. Percent complete.
  6. Float for each activity, where float is the amount of time that an activity can be delayed without delaying the start of the next activity.
- B. The Contractor's Progress Schedule shall be developed using the critical path method (CPM) and Microsoft Project or equivalent software.
- C. Activities:
1. The Progress Schedule shall identify all major construction activities.
  2. The Progress Schedule shall show all significant design, testing, submittals, manufacturing, shipping, construction, installation, commissioning and training activities, milestones for start of Work, completion of construction phases, and completion of commissioning, beneficial occupancy, and punch list.
  3. Any utility service interruptions necessary to perform the Work shall be identified.
  4. A separate activity shall be provided for each occasion where Work is to be performed by others.
  5. The Progress Schedule shall identify permits and approvals that are the responsibility of the Contractor.
  6. The Progress Schedule shall identify all Contractor's Work.
  7. The Progress Schedule shall identify Owner-furnished and Engineer-furnished items and any Work to be performed by the Owner or Engineer.

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**SECTION 01320**  
**CONSTRUCTION PROGRESS DOCUMENTATION**

- 8. The Progress Schedule shall identify draft invoice and final invoice submittal dates in accordance with monthly closing dates established by the Engineer.
- D. Contractor's Progress Schedule shall explain any additional information or coding used.
- E. Contractor shall consider normal calendar year holidays, weather delays, long lead items, review times, and Project phasing, Project Site conditions and space availability in preparing the Progress Schedule.
- F. The Contractor shall consider off-site disposal facility and trucking restrictions in preparing the Progress Schedule.
- G. The milestone completion dates required by the Specifications, listed in Bid Form Schedule F, Construction Milestones, shall be clearly identified on the Progress Schedule. The critical path shall be clearly indicated.
- H. The Progress Schedule shall be updated and submitted weekly at the time of the Weekly Progress Meeting. The Progress Schedule shall be available to all meeting participants during the Weekly Progress Meeting.

**1.05. DAILY CONSTRUCTION REPORT:**

- A. Contractor shall prepare a written Daily Construction Report in a format acceptable to the Engineer. The Daily Construction Report shall be prepared for each day Contractor is on the Project Site and submitted to the Engineer, electronically and in hard copy, no later than 10:00 A.M. the next Working day.
- B. Daily Construction Reports shall include:
  - 1. Number of Workers for each trade and the names of the Workers.
  - 2. Names of Sub-Contractors and their on-site employees.
  - 3. Hours of Work for each trade or type of equipment.
  - 4. Equipment on the Project Site and materials furnished.
  - 5. Major Work activities performed, and progress thereof, including estimated amounts of specialty Work, stockpiling, loading, dewatering, stormwater diversion, and backfilling Work completed.
  - 6. Odor, Vapor, or Dust mitigation work activities performed.

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**SECTION 01320**  
**CONSTRUCTION PROGRESS DOCUMENTATION**

7. Weather conditions and temperature to include daily precipitation total.
  8. Unforeseen subsurface conditions.
  9. A list of Submittals transmitted to or received from the Engineer.
  10. Meetings attended.
  11. Accidents, safety, and security issues.
  12. Tests and inspections performed and the results of tests and inspections.
  13. Reasons for construction delays.
  14. Units of Cost Plus Work, subject to approval daily by the Engineer.
  15. Units of T&M Work, subject to approval daily by the Engineer.
  16. Daily Trucking Logs as specified in Specifications Section 02120 – Off-site Transportation and Disposal.
  17. Vehicle Inspection Logs as specified in Specifications Section 02130 - Decontamination.
- C. If multiple daily Work shifts are used, Contractor shall submit a Daily Construction Report for each shift.
- D. The Daily Construction Reports may be used to substantiate any claim for delay, impact, or change, and shall contain sufficient information to document each potential impact.
- E. The Daily Construction Report may be used as the basis for documentation of T&M Work. The units of T&M Work reported by the Contractor's Project Superintendent shall be reviewed daily by the Engineer and are subject to approval by the Engineer. Contractor's Project Superintendent shall promptly make any changes, as required by the Engineer, to the units of T&M Work recorded on the Daily Construction Report.

**1.06. HEALTH AND SAFETY REPORTS:**

- A. Contractor's Daily Construction Report shall include a summary of daily Health and Safety meetings, conferences, issues, incidents, near misses, and actions taken to address and resolve Health and Safety issues.

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**SECTION 01320**  
**CONSTRUCTION PROGRESS DOCUMENTATION**

- B. Contractor shall immediately (within 30 minutes) verbally report to the Engineer the occurrence of any and all Health and Safety incidents, including, but not limited to, injuries, accidents, and unsafe conditions. An Incident Report form or Near-Miss Report form, which is included in Specifications Section 01415 – Health and Safety Requirements, shall be submitted to the Engineer within 24 hours of occurrence of the incident or near-miss. The Engineer will be the sole arbitrator of what is to be considered an incident or near miss.
- C. Contractor shall provide to the Engineer weekly summary reports of Contractor's Health and Safety performance, including number of hours Worked in the period and a list of Health and Safety incidents with the date, names of any individuals involved, type of incident, current status of any medical treatment of individuals for the incident, and actions taken by Contractor to address the incident or unsafe condition.
- D. Contractor shall report to the Engineer the occurrence of any situations requiring a permit or checklist for confined space entry or hot work (welding or torch cutting), and maintain documentation as specified in Specifications Section 01415 – Health and Safety Requirements.
- E. Additional reporting requirements are provided in Specifications Section 01415 – Health and Safety Requirements.

**1.07. RECORD DOCUMENTS:**

- A. Contractor shall maintain in a safe place at the Project Site one copy of all Weigh Tickets, Drawings, Survey Data, Specifications, Addenda, Permits, Change Orders, Field Orders, Work Change Directives, Submittals, Laboratory Data, Photographs and written interpretations and clarifications, in good order and annotated to show all changes made during construction. These Record Documents shall be available to the Engineer, Engineer, Owner, and NYSDEC representative upon request.
- B. During the course of the Work, Contractor shall maintain the following records up-to-date at the Project Site at all times, and shall submit the following documents to the Engineer prior to final Application for Payment:
  - 1. General Records:
    - a. Contractor's Daily Construction Reports.
    - b. Daily Safety Meeting minutes or notes.

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**SECTION 01320**  
**CONSTRUCTION PROGRESS DOCUMENTATION**

- c. Daily ISS Report.
    - d. Settlement Monitoring Logs.
    - e. Vibration Monitoring Logs.
    - f. Soil Tracking Logs.
    - g. Soil and debris disposal documentation (manifests, weight tickets, etc.).
    - h. Health and Safety Incident (Accident) Reports and Near-Miss Reports.
    - i. Hot Work Permits and Confined Space Entry Permits.
    - j. Minutes of all other Contractor meetings.
    - k. Progress Photographs and Videos.
  - 2. Test and Laboratory Analytical Results: One copy of all test and analytical results.
  - 3. Bills of Lading: One copy of all bills of lading for materials received.
  - 4. Record Drawings: At the end of construction, the Contractor's surveyor shall prepare Record Drawings showing horizontal and vertical Limits of the excavation areas; final grades and elevations; utilities including pipe invert elevations; site restoration including curb and pavement elevations; and other significant site features changed during construction. Record Drawings shall contain all components and be prepared as specified in Specifications Section 01720 – Surveying.
- C. At completion of the Project, the Contractor shall submit three electronic copies of all Record Documents to the Engineer.

**1.08. PROGRESS SCHEDULE REVIEWS, ACCEPTANCE, UPDATES, AND REVISIONS:**

- A. The initial Progress Schedule and all updates submitted by the Contractor shall be reviewed with the Owner and the Engineer and shall be revised and resubmitted if they do not receive the Owner's or the Engineer's approval. The schedule shall be reviewed for:
- 1. A sequence of Work that satisfies the requirements of the Contract Documents and is reasonable and logical.
  - 2. Activity durations, which are within an expected range, or can be justified by the Contractor to the satisfaction of the Owner and the Engineer.

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**SECTION 01320**  
**CONSTRUCTION PROGRESS DOCUMENTATION**

- B. This review shall not be construed as an assignment of responsibility of performance to the Owner or Engineer.
- C. Contractor shall make all necessary revisions to the initial Progress Schedule based on the Owner's review and resubmit within 2 days of receipt of comments from the Owner.
1. After the Owner's review, Contractor shall use the Progress Schedule for planning, organizing, and directing the Work and reporting progress.
  2. The Contractor shall bear sole responsibility for ensuring completion of the Work within the Contract Times.
  3. The Owner's or Engineer's acceptance of any Progress Schedule shall not transfer any of the Contractor's responsibilities to the Owner or Engineer. The Contractor alone shall remain responsible for adjusting forces, equipment, and schedules to ensure completion of the Work within the time(s) specified in the Contract Documents.
- D. Updates:
1. Contractor shall keep the Progress Schedule current during the Project so that it is an accurate indication of Project progress. Updates shall include any Field Orders, Work Change Directives, Change Orders, and delays.
  2. All updates should show progress compared to the project baseline schedule and include actual start dates.
  3. Contractor shall update the Progress Schedule weekly to document the construction progress. Contractor shall submit the weekly update on the day of the weekly Project meeting. Failure to submit a weekly updated Progress Schedule shall be cause for withholding of progress payments until the update is received and reviewed. Updates shall include a detailed 3-week look ahead, providing day by day, planned activities for the upcoming 3 week period.
  4. Activity descriptions shall not be changed.
  5. Any changes in the milestone dates must be approved, in writing, by the Engineer. Changes in milestone dates shall not cause an extension of the Project completion date without the execution of a Change Order.
- E. Revisions:

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**SECTION 01320**  
**CONSTRUCTION PROGRESS DOCUMENTATION**

1. In addition to weekly Progress Schedule Submittals, Contractor shall revise the Progress Schedule when additional Work, delays, or accumulations of causes indicate the Contract Times will be exceeded. Contractor shall submit a written statement describing the cause of the delay.
2. The Engineer shall require a revised Progress Schedule when it is apparent that the Contractor's schedule does not substantially match the actual progress and order of the Work as measured by:
  - a. Accumulated delays, which are more than 5 percent of the allotted Contract Times, or 15 calendar days, whichever is less.
  - b. Critical path activities (or activities restrained by critical path activities), which have been accomplished.

**PART 2 – MATERIALS**

Not used.

**PART 3 – EXECUTION**

Not used.

**END OF SECTION**

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**SECTION 01330**  
**SUBMITTAL PROCEDURES****PART 1 – GENERAL****1.01 SECTION INCLUDES:**

- A. Submittal Procedures
- B. Requests for Information
- C. Startup Submittals
- D. Outline of Contractor's Technical Execution Plan

**1.02 SUBMITTAL PROCEDURES:**

- A. Contractor shall prepare and transmit four copies of the following Submittals to the Engineer:
  - 1. Contractor shall submit a Technical Execution Plan as discussed in this Section
  - 2. Awarded Contractor shall submit a Project Operation Plan as discussed in this Section.
  - 3. Contractor shall submit Contractor's Daily Construction Report electronically by 10:00 A.M. the next Working day as specified in Specifications Section 01320 – Construction Progress Documentation.
  - 4. Contractor shall submit Applications for Payment as specified in Specifications Section 01290 – Payment Procedures.
  - 5. Contractor shall submit quality control reports and data as specified in other Sections of the Specifications.
  - 6. Contractor shall submit weekly revisions and updates of Progress Schedule and Technical Execution Plan as required by the Engineer.
  - 7. Contractor shall submit weekly Health and Safety reports, as specified in Specifications Section 01415 – Health and Safety Requirements.
- B. Each submittal will be reviewed and returned with one of the following Classifications:
  - 1. Approved: No exceptions taken; Contractor may proceed with the work.
  - 2. Approved As Noted: Contractor may proceed with the work subject to the comments and/or notes on the Submittal. Resubmittal is not required.



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**SECTION 01330**  
**SUBMITTAL PROCEDURES**

3. Revise and Resubmit: Contractor may not proceed with the work. Resubmittal is required for certain items.
- C. Contractor shall transmit each Submittal to the Engineer at the Project Site.
- D. Contractor shall provide four copies of each submittal (except dailies) to the Engineer.
- E. Contractor shall submit carbon copies (with all signatures affixed) of all waste manifests, weigh tickets, and other shipping documentation.
- F. Contractor shall transmit each Submittal with a cover letter signed by Contractor's Project Superintendent. Contractor shall, by signing each Submittal, certify that Contractor has reviewed the Submittal, and that the submitted information conforms to the requirements of the Work and these Specifications.
- G. Contractor shall sequentially number the transmittals (e.g., Submittal No. 001). Contractor shall number revised Submittals with original number and a sequential alphabetic suffix (e.g., Submittal No. 001a).
- H. Each Submittal shall include Project title, Contractor, Subcontractor or Supplier, title of Submittal, Specifications Section number and, if applicable, Drawing number.
- I. Submittals that do not conform to the requirements of the Specifications shall be returned with a notation of deficiencies. Contractor shall revise to correct noted deficiencies and resubmit. When revised for resubmission, Contractor shall identify all changes made since previous submission.
- J. Submittals not required by the Specifications shall not be recognized or processed.

**1.03 REQUESTS FOR INFORMATION:**

- A. Contractor shall submit all Requests for Information to the Engineer in writing. Requests for information shall be numbered sequentially and shall include the related Specifications Section number or Drawing number.
- B. The Engineer will provide any revisions to the Specifications or Drawings in writing.
- C. Contractor shall request written confirmation of any interpretations or clarifications provided verbally by the Engineer.

**SECTION 01330**  
**SUBMITTAL PROCEDURES****1.04 STARTUP SUBMITTALS:**

- A. This paragraph specifies Submittals that Contractor shall prepare and transmit prior to commencing the Work at the Project Site. Additional Submittals are specified in other Sections of these Specifications.
1. Contractor shall submit the initial Progress Schedule as specified in Specifications Section 01320 – Construction Progress Documentation.
  2. Contractor shall submit the Contractor's HASP as specified in Specifications Section 01415 – Health and Safety Requirements, including documentation of worker's OSHA training and medical monitoring and the name and qualifications of the full-time Site Safety and Health Officer.
  3. Certain parts of the Work are performance-based, requiring Contractor to provide detailed written information for review, comment, and approval by the Engineer and/or Owner, regarding the means and methods proposed by Contractor to execute the Work. Contractor shall submit a draft Technical Execution Plan, conforming to the outline specified in Subsection 1.05 of this section, for the Owner's and/or Engineer's review and comment. Contractor shall revise the draft Technical Execution Plan as requested by the Owner and/or Engineer and submit a final Technical Execution Plan, subject to the Owner's and/or Engineer's review, approval, and acceptance, prior to commencing Work. Any material changes in the Work, process, staffing, major equipment or materials will require a TEP amendment and review and approval by the Owner and/or Engineer.
  4. Contractor shall provide for Engineer's approval the name and qualifications for Subcontractors providing any laboratory, analyses, geotechnical, or surveying services as required in the Specifications and/or contract documents. Such approvals shall not be unreasonably withheld.

**1.05 OUTLINE OF THE TECHNICAL EXECUTION PLAN:**

- A. A Technical Execution Plan shall be provided by the Contractor as part of their proposal documents.
- B. Requirements of the Technical Execution Plan shall, at a minimum, include the following sections:
1. Section A: Project Coordination
    - a. Resume of Project Superintendent(s).

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**SECTION 01330**  
**SUBMITTAL PROCEDURES**

- b.** Identification of key personnel.
- c.** A list of proposed subcontractors, including truckers, disposal facilities, and cement-bentonite walls.

**2. Section B: Progress Schedule**

- a.** Contractor's initial Baseline Progress Schedule, based on the Construction Milestones listed in Bid Form Schedule F.

**5. Section C: In-Situ Solidification**

- a.** ISS Layout Drawing showing the configuration and layout of the ISS system. (The layout of the Batch Plant (ISS System) on the Design Figures is conceptual. The Contractor may propose his own layout based on available equipment.
- b.** Proposed auger size(s) and configuration.
- c.** Site map showing the proposed layout and pattern, including overlap ratio between adjacent columns, of the individual ISS columns.
- d.** Estimated production rate for solidification in terms of number of columns and cubic yards per day.
- e.** Proposed ISS reagents and design mix proportions.
- f.** Detailed descriptions and procedures for installing ISS columns within the influence line of the NYS&W railroad. Contractor shall coordinate approval of procedures for installation of ISS columns within the influence line of the NYS&W railroad with the same.
- g.** Detailed descriptions and procedures for Contractors approach to the ISS Swell/Spoils Management Excavation.
- h.** Estimated schedule for completion of the Work.
- i.** Any proposed deviations from the Specifications and Drawings.
- j.** Resumes for key personnel assigned to conduct the Work, including Project Superintendent; ISS rig operator, other equipment operators, reagent plant operators, supervisory engineering staff, and other technical staff.

**1.06 OUTLINE OF CONTRACTOR'S PROJECT OPERATIONS PLAN:**

- A.** Requirements of the Project Operations Plan include those identified in the Technical Execution Plan as well as those described throughout the technical specifications including, at a minimum, the following sections:

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**SUBMITTAL PROCEDURES**

- 1.** Section A: Project Coordination.
  - a.** Detailed Project staffing plan showing staffing levels for each task and phase of Work, along with any plans for shift Work.
  - b.** List of major Equipment, Systems, and Material, other than listed in Bid Form Schedule E.
  - c.** List of Permits and Approvals to be obtained by Contractor, including contact names, titles, and phone numbers.
- 2.** Section B: Construction Facilities and Temporary Controls.
  - a.** Locations, sizes, and requirements for utility services.
  - b.** Layout of Support Zone and other Work Zones, including Decontamination Zone.
  - c.** Proposed design for Site Access Road.
  - d.** Proposed design of Decontamination Stations.
  - e.** Decontamination Methods and Equipment.
    - i.** Procedures to prevent contamination of clean areas.
    - ii.** Vehicle decontamination and inspection procedures.
    - iii.** Procedures for collection, treatment, and disposal or discharge of decontamination residuals and used PPE.
- 3.** Section C: Water Treatment Facility and Water Storage
  - a.** Location, sizes, and capacities of the equipment.
  - b.** Manufactures product information and operation manual.
  - c.** Location of influent piping and effluent discharge.
- 4.** Section D: Dewatering
  - a.** Provide a detailed description of System to be used.
  - b.** Provide calculations to verify pumping capacity.
  - c.** Provide a sketch of the system with components and tie-in locations.
- 5.** Section E: In-Situ Solidification
  - a.** Description and specifications of ISS system, equipment, and processes, including available torque and available down-force applied at auger tip.

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**SECTION 01330**  
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- b.** Methods for determining and verifying the coordinates, elevations and depths of the ISS columns.
- c.** Tables showing installation depth, northing and easting, reference vertical and horizontal datum, affective and actual treatment volume, required reagent quantities and column diameter for each ISS treatment column.
- d.** Sample calculation for theoretical ISS column indicating required grout quantities.
- e.** Methods of controlling and mitigating exhaust, dust, and odor emissions and noise levels generated from the ISS equipment.
- f.** Methods for transporting, storing, protecting, and handling reagents, including controls and mitigation for dust and noise.
- g.** Detailed description and procedures for preparing reagent batch mixes, including methods to prepare and measure reagents to verify and document proper reagent mix proportions.
- h.** Detailed descriptions and procedures for controlling, measuring, monitoring, and documenting the injection of ISS reagents into the ground during each mixing pass.
- i.** Detailed descriptions and procedures for monitoring and documenting mixing energy, including auger rotation speed, penetration rate, and extraction rate during each mixing pass to verify that proper mixing energy is provided along the full length of the ISS column and that the resulting ISS column will be homogeneous.
- j.** Detailed description of a field test (Demonstration Test) to demonstrate that the proposed equipment and methods can successfully construct ISS columns to the specified depths and can create a homogeneous mixture of soil and grout meeting specified performance criteria.
- k.** Total estimated quantity of water and solidification reagents required for the Work.
- l.** Detailed solidification procedures and sequencing.
- m.** Equipment and methods for breaking existing ISS mass into sizes practical for in-situ re-solidification with vertical auger rig.
- n.** Associated dewatering procedures.
- o.** Construction water management, treatment and disposal procedures.
- p.** Stormwater run-on controls, management and discharge procedures.

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**SECTION 01330**  
**SUBMITTAL PROCEDURES**

- q.** Wash out and grout disposal facilities and practices.
  - r.** Procedures and materials for freeze protection of the grout pumping/ISS equipment to include flushing procedures to ensure “antifreeze agent” does not become mixed into grout and ISS treated soils.
  - s.** Spill control measures.
  - t.** Erosion control measures.
  - u.** Quality Control sampling methods, standard operating procedures, personnel, and equipment.
  - v.** Equipment manufacturer’s specifications and description.
  - w.** Method to manage/remove subsurface obstructions encountered during the ISS process.
- 6.** Section F: Excavation and Backfill.
  - a.** Detailed description of equipment and procedures to be used to excavate overburden soils and subsurface structures.
  - b.** Detailed description of excavation and backfill sequencing to minimize dewatering flows to the construction water treatment systems.
  - c.** Schedule for installation and operation of dewatering systems, including table showing coordination of dewatering systems with excavation.
  - d.** Excavation production rates in the form of a table of excavation volumes per week for each week of the Project Schedule. In the same table, show the estimated quantities of off-site transportation and the quantities of materials in stockpile.
  - e.** Figures showing locations of temporary on-site haul roads to support the progress of the excavation Work.
- 7.** Section G: Stockpile Management and Loading.
  - a.** Provide a Drawing showing the proposed layout of the stockpile area, including locations of stockpiles for Clean Material, Impacted Material, and Material to be tested. Show on-site truck routes, unloading areas for excavated soil, and loading areas for off-site transportation.
  - b.** Methods and facilities for managing stormwater run-on, runoff from stockpile areas, and water drained from saturated Impacted Soils.
  - c.** Truck loading areas, staging areas for incoming empty trucks.
  - d.** Coordination of excavation, stockpiling, and loading.

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**SECTION 01330**  
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- 8.** Section H: Off-site Transportation.
  - a.** Provide names and qualifications of proposed transporters and number of vehicles dedicated to the project.
  - b.** Provide an estimate, by day, of the expected quantities of material to be shipped from the site. Describe the number of trucks to be used, the expected turn-around-times, and the expected number of trips per day.
  - c.** Describe locations and procedures for staging and sequencing trucks to minimize disruption and obstruction of the area around the site.
  - d.** Describe locations and equipment to be used to weigh haul trucks. Include frequency for obtaining true weight of trucks.
  - e.** Provide a Traffic Control Plan showing how trucks will enter and exit the site, the location of flaggers and signs, truck driver orientation and acceptance forms that shall include truck driver responsibilities as specified in the Transportation Plan, designated haul route to and from the off-site disposal facilities with posted speed limits, warnings, etc., and incident reporting procedures for trucking related incidents.
  - f.** Provide a plan for verifying the accuracy of weight scales.
- 9.** Section I: Disposal Facilities
  - a.** Detailed description of disposal facilities to be used and their daily capacities.
- 10.** Section J: Site Restoration.
  - a.** Describe proposed procedures and equipment and materials to be used to restore disturbed areas. Provide a description of proposed method for the following:
    - i.** Placing gravel backfill.
    - ii.** Replacing asphalt.
    - iii.** Replacing curb and sidewalk.
    - iv.** Construction of the ISS monolith Caps

**PART 2 – PRODUCTS**

Not used.

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**SECTION 01330**  
**SUBMITTAL PROCEDURES**

**PART 3 – EXECUTION**

Not Used.

**END OF SECTION**



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**SECTION 01415**  
**HEALTH AND SAFETY REQUIREMENTS****PART 1 – GENERAL****1.01 SECTION INCLUDES:**

- A. Summary
- B. References
- C. Contractor's Responsibility for Health and Safety
- D. Submittals
- E. Notifications
- F. Equipment and Facilities
- G. Personal Protective Equipment
- H. Other Health and Safety Equipment
- I. Training
- J. Work Planning and Meetings
- K. Engineering Controls
- L. Monitoring
- M. Evaluation of Performance
- N. Report of Incident Form
- O. EHS Opportunity or Near Miss Report Form
- P. Hot Work Permit Form
- Q. Job Safety Analysis
- R. Safety Task Analysis Review (STAR) Form

**1.02 SUMMARY:**

- A. This Section includes Specifications and requirements for Health and Safety during performance of Work, including identification of applicable regulations, submittals, notification requirements, and Health and Safety execution.

**1.03 REFERENCES:**

- A. Applicable regulations and publications include, but are not limited to, the following:
  - 1. OSHA, Title 29 CFR Part 1910, Occupational Safety and Health Standards, and Title 29 CFR Part 1926, Safety and Health Regulations for Construction Sites.
  - 2. NFPA, Flammable and Combustible Liquids Code, NFPA 30, most recent revision.
  - 3. USEPA, Standard Operating Safety Guidelines, November 1984.
  - 4. DHHS, "Manual of Analytical Methods", 3rd edition Volumes I and II, DHHS (NIOSH) Publication 84-100.

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**HEALTH AND SAFETY REQUIREMENTS**

5. ANSI, Practices for Respiratory Protection, Z88.2, most recent version.
  6. ANSI, Emergency Eyewash and Shower Equipment, Z358.1, 1981.
  7. ANSI, Protective Footwear, Z41.1, 1983.
  8. ANSI, Respirator Use Physical Qualification for Personnel, Z88.6, 1984.
  9. ANSI, Practice for Occupational and Educational Eye and Face Protection, Z87.1, 1979.
  10. NIOSH/OSHA/USCG/USEPA, Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities, DHHS/PHS/CDC/NIOSH, October 1985.
  11. NIOSH Pocket Guide to Chemical Hazards, DHHS/PHS/CDC/NIOSH, June, 2000 or most recent.
  12. USEPA, Health and Safety Requirements for Personnel Engaged in Field Activities, USEPA Order No. 14402.
  13. DOT Standards and Regulations, 49 CFR 171 and 49 CFR 172.
  14. ACGIH, Threshold Limit Values and Biological Exposure Indices (most recent version).
  15. Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, EPA/600/4-87-006, September 1986.
- B. Where two or more regulations/documents conflict, the one(s) offering the greatest degree of protection shall apply.

**1.04 CONTRACTOR'S RESPONSIBILITY FOR HEALTH AND SAFETY:**

- A. Contractor shall comply with any and all state, federal, and local ordinances, standards and regulations.
- B. Contractor shall be responsible for the Health and Safety of Contractor's employees, its Subcontractors, suppliers, agents, inspectors, visitors, the general public, and any others associated with or interacting with Contractor who provides labor, goods, or other services on the Project Site.

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**SECTION 01415**  
**HEALTH AND SAFETY REQUIREMENTS**

- C. Contractor shall be responsible for emergency response planning and notification, and for actual response to any and all emergencies that may occur during the course of the Work, including emergencies that may occur when Contractor is not present at the Project Site.
- D. Contractor is responsible for communicating daily with the Engineer regarding Health and Safety issues for the Owner Representatives safe conduct of the Owner Representatives duties, but such communication shall not imply any duty or responsibility on the part of the Engineer or Owner with regard to Health and Safety of Contractor's employees, its Subcontractors, suppliers, the general public, or Others. The Engineer's responsibility and duty with regard to Health and Safety shall be limited to the Engineer and Engineer's employees. Contractor shall have responsibility and duty to the Engineer to communicate Health and Safety issues accurately and in a timely manner to allow the Engineer to take appropriate actions to protect the Engineer, Engineer's employees and the Owner's employees.
- E. Contractor shall designate a dedicated Contractor's SSHO on the site during the Work who shall, at a minimum, have at least 4 years of experience as an SSHO on an uncontrolled hazardous waste site, and have 40-hour OSHA Hazardous Waste Operations training and 8-hour OSHA Supervisor training and have taken the 30-hour OSHA Construction Industry safety class. Contractor's SSHO shall be solely dedicated to Health and Safety issues from the start of the site activities through completion.
- F. The SSHO shall enforce the requirements of safety for all Contractor personnel on site at all times. The SSHO shall ensure that all Contractor personnel, Subcontractor personnel, and Contractor visitors, follow the HASP, including wearing the designated level of PPE. If the SSHO elects to require a higher level of protection than that specified in the HASP, the extra costs associated with such higher level shall be borne by Contractor, unless such extra costs are approved in advance in writing by the Engineer.
- G. Prior to mobilization and continually throughout the duration of the Work, the SSHO shall inspect the Project Site and document area-specific and worker-specific protection requirements.
- H. After mobilization, the SSHO shall monitor activities and shall document the need for additional worker protection as required, based on activities performed and Action Levels specified in the HASP.
- I. The SSHO shall verify that all activities are performed in accordance with the HASP and all federal, state, local, and Health and Safety standards, regulations, and guidelines.
- J. In the event of a health or safety risk, as determined by the SSHO or by other Contractor personnel or by the Engineer, Contractor shall not proceed with the Work until a method for handling the risk has been determined in consultation with the Engineer and

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**SECTION 01415**  
**HEALTH AND SAFETY REQUIREMENTS**

implemented. Any health or safety risk resulting in a stoppage of Work shall be reported immediately to the Engineer.

- K. Contractor shall be responsible for implementing a “Behavior Based Safety” process and providing site training, observation, and feedback for Contractor personnel employed at the site.
- L. Contractor shall be responsible for stability of excavations and embankments caused by the Contractor’s Work. Contractor shall designate one competent person as defined in 29 CFR Part 1926, Subpart P, Excavations, to inspect and document excavation safety conditions daily, and to ensure excavation safety prior to any personnel entering an excavation.
- M. Contractor shall designate one competent person (e.g., crane operator), certified in crane operations, to inspect and document safe crane operation daily, and to ensure safety of crane operation prior to starting ISS installation activities.
- N. The Engineer shall provide the Contractor with a copy of the Engineer’s HASP as a reference.

**1.05 SUBMITTALS:**

- A. Contractor shall prepare and submit a HASP to the Owner as a part of the Technical Execution Plan. The Contractor shall follow all applicable local, state, and federal Health and Safety standards, regulations, and guidelines implemented through, but not limited to, the OSHA, NIOSH, ACGIH, and USEPA. Where these are in conflict, the most stringent requirement shall be followed. The following points shall be addressed in the Contractor’s HASP:
  - 1. Names of key personnel and alternates responsible for Health and Safety, including a Contractor Health and Safety Representative and SSHO. The Owner must approve the SSHO.
  - 2. A Health and Safety risk or Job Safety Analysis (JSA) associated with each portion of the Work (i.e., list potential chemical and physical hazards), including JSHAs for excavation work around active utilities, excavation safety, crane operation safety, ISS work, and truck traffic into and out of the site.
  - 3. Employee and Subcontractor training assignments to assure compliance with 29 CFR 1910.120.
  - 4. A requirement that Contractor locate Underground Facilities by using “Safe Dig” procedures prior to the start of the Work.

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**SECTION 01415**  
**HEALTH AND SAFETY REQUIREMENTS**

5. Personal protective equipment (PPE) to be used for each of the site tasks and operations being conducted, as required by the PPE program in 29 CFR 1910.120 and 29 CFR 1926.
6. Medical surveillance requirements in accordance with the program in 29 CFR 1910.120.
7. Frequency and types of air monitoring, personnel monitoring, and environmental sampling techniques and instrumentation to be used by the Contractor, including methods of maintenance and calibration of monitoring and sampling equipment.
8. Corrective actions and upgrading of personnel protection based on monitoring of air, personnel, and environmental sampling, with specific Action Levels identified.
9. Site control measures in accordance with the control program required in 29 CFR 1910.120 and 29 CFR 1926.
10. Decontamination procedures in accordance with 29 CFR 1910.120 and Specifications Section 02130 – Decontamination.
11. An emergency response plan meeting federal, state, and local requirements for safe and effective responses to emergencies, including the necessary PPE and other equipment. Explanation of potential emergencies and contingency plan of action, including description of the route to the nearest appropriate hospital, hospital route map, and posting of emergency telephone numbers at the site.
12. If confined space entry is required, include confined space entry procedures in accordance with 29 CFR 1910.146, 29 CFR 1926. 1201 and a list of all anticipated confined space entries required by Contractor in the course of the Work.
13. A spill containment program meeting the requirements of all applicable local, state, and federal Health and Safety standards.
14. A list of Health and Safety and emergency equipment available on the site.
15. A description of engineering controls used to reduce the hazards of equipment operation and exposure to site hazardous chemicals.
16. An air monitoring plan describing the method, type, frequency, locations of air monitoring, laboratories, and type of analysis to be performed at the Work area for the purpose of employee safety.

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**SECTION 01415**  
**HEALTH AND SAFETY REQUIREMENTS**

17. Open trench excavation procedures in accordance with applicable OSHA Regulations 29 CFR 1926.640.
  18. Procedures for earthwork near buried utilities, where hand digging should be performed within 24 inches of known utility lines unless more stringent requirements are specified by law, Regulation, or the affected utility.
  19. Lockout/Tagout where the operation of machinery and/or equipment in which the unexpected energization on start up or the release of stored energy could cause injury to personnel.
  20. Fall protection in accordance to 29 CFR 1926, 501 where employees are working 6-feet above a lower level, where there is a possibility of a falling from any height onto or into dangerous equipment and onto an impalement hazard.
- B. Contractor's Daily Construction Report, submitted in accordance with Specifications Section 01320 – Construction Progress Documentation, shall include a summary of daily safety issues and a summary of Contractor's Daily Safety Meeting.
- C. Contractor shall submit monthly safety reports that include:
1. The names of all Contractor and Subcontractor personnel employed at the site at any time during the month, and the names and duties of key personnel including Contractor's Project Manager, Project Superintendent, SSHO, excavation-competent person, and crane operation-competent person.
  2. A summary of all Health and Safety incidents describing any medical treatment that was provided during the month, the current Work status of any affected individuals, the names of individuals who may have observed the incident, and actions taken by Contractor to address the unsafe act or unsafe condition.
  3. A summary of all Health and Safety near-misses or observations providing an opportunity for shared learning and future hazard avoidance. For any Health or Safety incident or near-miss, list the date, the nature of the incident or near-miss, and the names of individuals involved. A near-miss form for use in submitting near-misses is attached to this Section.
  4. The total number of labor hours worked at the site during that month.
  5. Internal Health and Safety audits performed by the Contractor as part of the Contractor's HASP.

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**SECTION 01415**  
**HEALTH AND SAFETY REQUIREMENTS**

6. Results of Contractor behavioral observation and feedback evaluations as described in the Engineer's HASP.
- D. Prior to initiating Work, Contractor shall provide the Engineer with documentation of employee and applicable Subcontractor training and medical certifications required by 20 CFR 1910.120 as described in 3.01A of this Section.
- E. Contractor shall submit documentation of training and experience for the designated excavation-competent person and crane operation-competent person.
- F. Contractor shall maintain all required and applicable training and medical monitoring records on-site including, but not limited to those specified in Part 3.01A of this Section.
- G. Contractor shall submit a Hot Work Permit, using the form attached to this Section, for any welding, torch cutting, or activities that generate sparks. Proximity to any ignitable or combustible liquids including MGP waste such as NAPL or tar shall be accounted for and precautions and setbacks shall be provided for prior to issue of permit.
- H. Contractor shall complete a JSA for significant activities and submit the documentation to Engineer for review prior to the start of the activities. Contractor's JSA shall be submitted on the JSA forms attached to this Section, or other form acceptable to the Engineer.
- I. Contractor shall submit copies of all periodic crane and drill rig inspections completed.

**1.06 NOTIFICATIONS:**

- A. Contractor shall immediately (within 30 minutes) verbally report to the Engineer the occurrence of any and all Health and Safety incidents. An Incident Report or Near-Miss Report forms as appropriate, which are attached to this Section, shall be submitted within 24 hours of occurrence of the incident or issue.
- B. Contractor shall immediately and fully investigate any such incident or near miss and conduct a root cause analysis, and shall submit to the Engineer, the Contractor's written corrective action plan for such incident within one day after the incident occurs in accordance with Specifications Section 01330 – Submittal Procedures.
- C. Contractor shall notify the Engineer in writing at least 5 days prior to bringing any hazardous material, equipment, or process to the site, or using the same on the site. Contractor shall provide the Engineer with a Safety Data Sheet (SDS) for all chemicals brought on to the site.



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**SECTION 01415**  
**HEALTH AND SAFETY REQUIREMENTS**

- D. Contractor shall immediately notify the Engineer in writing of any hazard that Contractor discovers or observes on the site and corrective measures planned or taken to eliminate or minimize such hazard. Hazard reporting will be completed as a Near Miss Report as described in Subsection 1.05C.3 of this Section.

**PART 2 – PRODUCTS****2.01 EQUIPMENT AND FACILITIES:**

- A. Contractor shall provide all equipment, temporary facilities, and personnel required to perform activities on site safely in accordance with all Regulations and standards, and with the Contractor's HASP.

**2.02 PERSONAL PROTECTIVE EQUIPMENT:**

- A. The appropriate level of PPE shall be determined by the Contractor for specific tasks as described in the Contractor's HASP. If hazards are identified that require a level of protection greater than Level C, Work shall be suspended and the Engineer notified. The Contractor's SSHO, in consultation with the Engineer, shall determine what actions are required prior to restarting Work. Contractor shall determine and document the appropriateness of suggested minimum PPE requirements for Contractor's employees and others at the site.
- B. Contractor shall furnish and maintain materials and equipment for the Health and Safety of Contractor employees, its Subcontractors, suppliers, and visitor personnel. Contractor shall provide all required Health and Safety equipment, first aid equipment, tools, monitoring equipment, PPE, and ancillary equipment and methods required to ensure workers' Health and Safety and to comply with the Contractor's HASP. The Engineer will furnish PPE for Engineer's employees and Owner's employees.
- C. Level D protection will be required at all times while on site by all personnel and visitors on the site, except in Support Zone areas. Level D PPE consists of:
1. Hard hat.
  2. Steel-toed boots.
  3. Safety glasses with permanent side shields.
  4. Work clothes (long pants, shirts with sleeves).
  5. Work gloves.



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**SECTION 01415**  
**HEALTH AND SAFETY REQUIREMENTS**

6. High visibility reflective safety vests.
  7. Hearing protection (as needed to prevent exposure exceeding 85 dB level).
- D. If additional protection consisting of Level C PPE is required during the Work, Level C PPE shall include protection from organic compounds and consist of Level D protection with the following additions:
1. Air purifying respirator, half-face or full-face (depending on required protection factor) with organic vapor/High Efficiency Particulate Air cartridges meeting NIOSH/Mine Safety and Health Administration Specifications.
  2. Disposable poly-coated chemically protective coveralls (blue or grey).
  3. Disposable chemically resistant outer gloves (nitrile).
  4. Disposable chemically resistant inner gloves (nitrile).
  5. Chemically resistant, steel-toed, and steel-shank boots (PVC, neoprene, or nitrile), or outer booties.
- E. In most cases, Level C will be the maximum allowed level of PPE. Level B may be allowed provided that personnel are properly trained and certified and exposure levels are below immediately dangerous to life and health (IDLH) conditions.

**2.03 OTHER HEALTH AND SAFETY EQUIPMENT:**

- A. Contractor is required to have the following equipment available on the site for the Health and Safety of Contractor, Subcontractors, suppliers, and visitors:
1. First aid kits.
  2. Fire suppression equipment (appropriate to location and type of flammable materials present).
  3. OSHA-approved emergency eyewash facilities.
  4. Personnel decontamination facilities and equipment.
  5. Other equipment or supplies as determined to be necessary or prudent by Contractor or the Engineer.
  6. Flammable liquids storage cabinet, if necessary.



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## **SECTION 01415**

### **HEALTH AND SAFETY REQUIREMENTS**

7. Fall protection equipment.
8. Heavy Blankets.

## **PART 3 – EXECUTION**

### **3.01 TRAINING:**

- A. Contractor shall provide the following training to each worker except those who will be restricted to the Support Zone:
  1. Initial 40-hour (or 80-hour where appropriate) OSHA hazardous waste Health and Safety training and current annual 8-hour refresher training.
  2. Eight-hour OSHA hazardous waste supervisory training (required for the Contractor's Superintendent and SSHO).
  3. Thirty-hour OSHA Construction Industry training for ( required for the Contractor's Superintend and SSHO.
  4. Enrollment in a medical monitoring program, with clearance within the previous 12 months from a licensed physician allowing the worker to participate in field activities and use respiratory protective equipment. Contractor shall not submit detailed medical information for employees.
  5. Current respiratory fit testing certification.
  6. Current cardiopulmonary resuscitation (CPR) and first aid certification for at least two workers assigned to Work on the site.
  7. For one who is assigned the role of a "competent person," documentation of sufficient and relevant training and experience to perform the assigned duties and responsibilities of that role. As defined in 29 CFR 1926.31, the competent person shall be "one who is capable of identifying existing and predictable hazards, and who has authority to take prompt corrective measures to eliminate them." Relevant training and experience shall be in the same type of Project activities included in the Work under this Contract.
- B. Contractor shall designate one "competent person" as defined in 29 CFR Part 1926, Subpart P, Excavations, to inspect and document excavation safety conditions daily, and to ensure excavation safety prior to any personnel entering an excavation.

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**SECTION 01415**  
**HEALTH AND SAFETY REQUIREMENTS****3.02 WORK PLANNING AND MEETINGS:**

- A. Contractor shall conduct a daily Health and Safety meeting, prior to beginning Work for that day, to address Health and Safety issues, changing site conditions, activities and personnel. All Contractor and Subcontractor employees working on the site on that day shall attend the meeting. All meetings shall be documented and attendees shall sign acknowledgement of their presence at the meeting. Daily meetings shall include a STAR evaluation of the Work to be conducted and to document meeting attendance and discussion points. The STAR evaluation and daily safety meeting shall be documented on STAR forms, which are attached to this Section.
- B. Subcontractor personnel who are not in attendance for the daily Health and Safety meeting shall be briefed on the meeting notes upon arrival at the site and prior to commencing their Work activities. Employees shall sign acknowledgement of briefings prior to commencing Work.
- C. Contractor shall hold and document additional safety meetings at the start of each major task and whenever site conditions affecting personnel safety change. Any major task undertaken shall require the completion of a JSA as described in 1.05H of this Section.

**3.03 ENGINEERING CONTROLS:**

- A. Contractor shall, at a minimum, provide the following engineering controls to reduce the hazards of equipment operation and exposure to site hazardous chemicals:
  - 1. Roll-over cages for bulldozers, back hoes, loaders, and tractors.
  - 2. Back-up alarms for all trucks and moving equipment.
  - 3. Wetting of soil or other means to control dust during the Work.
  - 4. Decontamination of personnel and equipment in accordance with Specifications Section 02130 - Decontamination.
  - 5. Barricades for open trenches and excavations.
  - 6. Sloping, benching, shoring, drainage systems, or other controls as necessary to ensure stability of excavations and embankments.
  - 7. Providing a dedicated flag person or persons to manage truck traffic along and into and out of the site.

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**SECTION 01415**  
**HEALTH AND SAFETY REQUIREMENTS**

8. Provide odor, vapor, and dust emission control as specified in the CAMP and as directed by the Engineer.
  9. Provide guardrail systems with toe board as a means of fall prevention.
  10. Machine guards on machinery that employees can get caught in or between.
  11. Others as determined to be necessary or prudent by Contractor or as directed by the Engineer.
- B. Contractor shall post ground level warning signs every 50 feet below all overhead utilities on site.

**3.04 MONITORING:**

- A. Contractor shall perform heat exposure and cold exposure monitoring activities as required by weather conditions.
- B. The Contractor shall perform all air monitoring activities described in the Contractor's HASP required to provide Health and Safety protection to the Contractor's and Subcontractor's personnel.
- C. The Site Perimeter Community Air Monitoring shall be conducted by Others.

**3.05 EVALUATION OF PERFORMANCE:**

- A. Contractor shall routinely conduct internal safety audits on Subcontract and Sub-subcontract Work sites in accordance with the Contractor's HASP. The focus of these routine audits will be on compliance with OSHA and local occupational safety regulations.

**END OF SECTION**  
**HEALTH AND SAFETY FORMS FOLLOW**



## SECTION 01415 HEALTH AND SAFETY REQUIREMENTS

### REPORT OF INCIDENT

1. Seek immediate medical attention if necessary.
2. Employee must report all incidents to their supervisor immediately.
3. Supervisor calls the onsite project Engineer's representative.

#### Section 1 - Organization Information

District:	Section/Dept Number:
Office Name:	
Client Name:	Project Number:
Project Name:	

#### Section 2 - Type of Incident (SRI Sections to be Completed)

<input type="checkbox"/> Injury/ illness (Sections 3, 4, and 7)	<input type="checkbox"/> Vehicle Incident (Sections 3, 4, 5, and 7)	<input type="checkbox"/> Property Damage (Sections 3, 4, 6 and 7)	<input type="checkbox"/> Environmental Spill/Release (Sections 3, 4, and 7)
<input type="checkbox"/> Regulatory Inspection or Notification: (Sections 3, 4,7)			<input type="checkbox"/> Other (describe)

#### Section 3 – Contact/Incident Information

Employee/Claimant Name:	Employee Job Title:	<input type="checkbox"/> Full-Time Employee <input type="checkbox"/> Subcontractor/Subconsultant <input type="checkbox"/> Temp Agency Employee <input type="checkbox"/> Part-Time Employee <input type="checkbox"/> Third Party Employee	
Work Phone:	Cell Phone:	Home Phone:	Employee Number:
Date/Time of Incident:		Date/Time Reported to Supervisor:	
Street Address of Incident or approximately:		City:	State/Zip:
Body Part Injured:	Type of Treatment: Medical/hospital or doctor <input type="checkbox"/> First Aid Only <input type="checkbox"/>		
Medical Facility Contact Info: (Name, Address, Phone)			



## SECTION 01415 HEALTH AND SAFETY REQUIREMENTS

### Section 4 - Descriptions of Incident (*employee, supervisor and witness statements*)

Employee Description of Incident:          (use additional paper if necessary)		
Employee Signature:		Date and Time:
Supervisor Description of Incident: (Supervisor signs in Section 7)          (use additional paper if necessary)		
Witness Name :	Witness Address:	Witness Phone No.:
Witness Description of the Incident:          (use additional paper if necessary)		
Witness Signature:		Date and time:



**SECTION 01415**  
**HEALTH AND SAFETY REQUIREMENTS**

**Section 5 - Vehicle Incident Information (fill out for motor vehicle incidents only)**

5a - Driver Name:			Drivers License #:		State Issued:		Expiration Date:	
Vehicle Year:		Make:	Model:	Color:		License Plate:		State:
VIN Number:								
Vehicle was:		<input type="checkbox"/> Owned <input type="checkbox"/> Leased		<input type="checkbox"/> Rented <input type="checkbox"/> Personal Vehicle		Who was involved?		<input type="checkbox"/> Vehicle(Section 5a) <input type="checkbox"/> Another Vehicle(Section 5b)
								<input type="checkbox"/> Pedestrian <input type="checkbox"/> Property
Use of Vehicle at Time of Incident: <input type="checkbox"/> Office Visit <input type="checkbox"/> Site Visit <input type="checkbox"/> Client Meetings <input type="checkbox"/> Field Work <input type="checkbox"/> Personal <input type="checkbox"/> Other_____						Vehicle Type: <input type="checkbox"/> Commercial Motor Vehicle <input type="checkbox"/> Non Commercial Motor Vehicle		
5b - Name of Other Driver:				Address:		City:		State/Zip:
Work Phone:				Cell Phone:				
Date of Birth:		Drivers License #:		State Issued:		Expiration Date:		
Vehicle Year:		Make:	Model:	Color:		License Plate:		State:
VIN Number, Insurance Company Name, Insurance Policy Number:								
If Vehicle Owner is different from driver then complete owner's contact information				Owner Name:				
				Address, City, State, Zip:				
				Work Phone:		Cell Phone:		
Authorities contacted? <input type="checkbox"/> Yes <input type="checkbox"/> No				If so, who responded?				
Citations Issued? <input type="checkbox"/> Yes <input type="checkbox"/> No				Type of Citation:		Person Cited:		



## SECTION 01415 HEALTH AND SAFETY REQUIREMENTS

### Section 6 - General Liability (*Fill out for property damage only*)

Description of damaged property:	
Where can the property be seen?	
Property Owner Name:	
Address, City, State, Zip:	
Work Phone:	Cell Phone:

### Section 7- Signatures

#### Supervisor

Print Name:	Signature:	Date:	Telephone:
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#### Office/Location Manager

Print Name:	Signature:	Date:	Telephone:
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#### NYSEG Project Manager

Print Name:	Signature:	Date:	Telephone:
Comments:			

**Attention: This form must be completed and forward to the NYSEG Project Manager within one (1) business day following the occurrence of the incident.**





## SECTION 01415 HEALTH AND SAFETY REQUIREMENTS

### EHS OPPORTUNITY OR NEAR MISS REPORT

Reported by: \_\_\_\_\_ Incident Date/Time: \_\_\_\_\_  
Date Reported: \_\_\_\_\_ Site Location: \_\_\_\_\_

#### Report Type (check one):

- ☐ EHS Opportunity (*suggestion for improvement, good EHS idea to share, or EHS observation*)  
☐ EHS Near Miss (*event that could have resulted in an incident under different circumstances*)

#### Event Description:

*Describe key aspects such as the operation in progress, worker experience, potential outcome of event, and any contributing conditions. Use additional sheets as necessary.*

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#### Hazard Category (check all that apply):

- |                                         |                                                          |                                           |
|-----------------------------------------|----------------------------------------------------------|-------------------------------------------|
| <input type="checkbox"/> Slip/trip/fall | <input type="checkbox"/> Traffic/vehicle                 | <input type="checkbox"/> Plant/Animal     |
| <input type="checkbox"/> Chemical       | <input type="checkbox"/> Electrical                      | <input type="checkbox"/> Faulty equipment |
| <input type="checkbox"/> Weather        | <input type="checkbox"/> Not following procedures        | <input type="checkbox"/> Fire             |
| <input type="checkbox"/> Improper PPE   | <input type="checkbox"/> Improper body position/tool use |                                           |
| <input type="checkbox"/> Other: _____   |                                                          |                                           |

#### Possible Outcome (check all that apply):

- ☐ Injury/illness      ☐ Property damage      ☐ Environmental release

#### Were you able to correct the problem?

- ☐ Yes      ☐ No      If no, whom did you inform: \_\_\_\_\_      ☐ N/A

#### Potential Outcome if Circumstances Occurred:

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#### Corrective Action Taken:

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**SECTION 01415**  
**HEALTH AND SAFETY REQUIREMENTS**

**HOT WORK PERMIT**

**Permit Valid  
For 1 Work Day**

**Site Name:** \_\_\_\_\_

**Project Number:** \_\_\_\_\_

**EHS Officer:** \_\_\_\_\_

**Client:** \_\_\_\_\_

**Hot Work Description:** \_\_\_\_\_

**Workers/Welders Conducting Hot Work:** \_\_\_\_\_

**Permits MUST be completed in its Entirety Before Hot Work Begins**

	Yes	No
Has Project supervisor been notified of intended Hot Work?		
Does client representative need to be notified of the intended Hot Work?		
Will Hot Work impact the general public, clients, or operation employees?		
Will the intended Hot Work need to be coordinated with other contractors who may be working on the site to make them aware of any hazards and the scope of work to be performed?		
Have hazardous energy sources been identified, isolated, and locked out/tagged out before the start of the Project?		
Will Hot Work be conducted within a confined space?		
All testing equipment (i.e., CGI, oxygen meter, etc.) and firefighting equipment (i.e., extinguisher, etc.) have been checked to ensure proper operation and calibration before the start of this Project?		
Has a fire watch been designated and on station?		
Have coatings on metal surfaces been tested for ignitability and flame spread?		
Has the area been cleared of all flammable materials?		
Have all fuel sources been identified and protected?		
Has the area been restricted with proper barriers and signs?		
Has the area been tested to be certain that atmosphere is 0% LEL before starting Hot Work?		
Have flame sensitive areas and equipment (including cylinders and gas delivery lines) exposed to slag and sparks been protected by flame resistant blankets or removed from the area?		
Have all equipment and hoses been protected from falling metal structures and debris?		
Have escape routes been identified before starting work?		
Is ventilation equipment needed? Type needed:		

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## SECTION 01415 HEALTH AND SAFETY REQUIREMENTS

### The Following Protective Equipment Will be Required:

	Yes	No		Yes	No
Welding Goggles/Shield Tint			Supplied Air Respirator		
Safety Boots			Head Protection		
Leather gloves			Safety Harness		
Hearing Protection			Welding Leathers – Top		
APR Cartridge			Welding Leathers - Bottom		

### Permit Valid for 1 Work Day

The following procedures will be applicable prior to Hot Work on tanks or other types of enclosed structures. (Check all that apply and fill in appropriate information.)

- ☐ Ventilate to 0% LEL
- ☐ Confined Space Entry Permit
- ☐ Mechanical Ventilation Required
- ☐ Cold Cut Only                      Method Allowed: \_\_\_\_\_
- ☐ Hot Cutting Permitted                      Method Allowed: \_\_\_\_\_

Inert to < \_\_\_\_\_ % Oxygen

### Approvals:

\_\_\_\_\_  
Date

\_\_\_\_\_  
Client Representative

\_\_\_\_\_  
Contractor Site Safety Officer

\_\_\_\_\_  
Fire Watch

\_\_\_\_\_  
Performed Hot Work Employee

*File Permit in Project Work File and Health and Safety Department*

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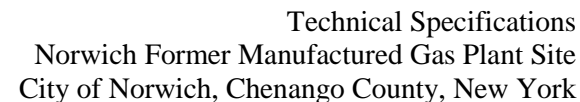


**SECTION 01415**  
**HEALTH AND SAFETY REQUIREMENTS**

**JOB SAFETY ANALYSIS**

JSA Type: <input type="checkbox"/> Investigation <input type="checkbox"/> O&M <input type="checkbox"/> Office <input type="checkbox"/> Construction		<input type="checkbox"/> New <input type="checkbox"/> Revised		Date:
Work Activity:				
<b>Personal Protective Equipment (PPE):</b>				
Development Team	Position/Title	Reviewed By	Position/Title	Date
❶ Job Steps <sup>1</sup>	❷ Potential Hazards <sup>2</sup>	❸ Critical Actions <sup>3</sup>	 Stop Work Criteria	

Page \_\_ of \_\_



## Safety Task Analysis Review (STAR)

Task Description:

Signatures of Personnel on Task Analysis  
Review/Tailgate Meeting:

[illegible]

Mentor Assigned to Work

Lessons Learned (Based on changes in conditions, EHS Near- Incidents/ Observations, Potential Emergencies)  
Is there a better/safer way to perform the work/task?

Company: \_\_\_\_\_  
Completed By: \_\_\_\_\_  
Date: \_\_\_\_\_  
Job Location: \_\_\_\_\_

Tailgate Meeting Topic

**Supervisor Review (date/Time):** \_\_\_\_\_

**EHS Review (date/time):**

Comments:

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## SECTION 01415 HEALTH AND SAFETY REQUIREMENTS

### Identify Potential Hazards

- ☐ Abrasions
- ☐ Biological Hazards (Plants, Animals, Insects)
- ☐ Cave-in (Trench/Excavation Work)
- ☐ Chemical/Thermal Burn
- ☐ Cuts
- ☐ Dermatitis
- ☐ Dropping Materials/Tools to Lower Level
- ☐ Drowning/Flowing Water
- ☐ Dust
- ☐ Electrical Shock
- ☐ Elevated/Overhead Work
- ☐ Energized Equipment
- ☐ Fire
- ☐ Flammability
- ☐ Foreign Body in Eye
- ☐ Hazardous Materials (Exposure or Release)
- ☐ Heat or Cold Stress
- ☐ Heavy Equipment Operation
- ☐ Heavy Lifting
- ☐ High Noise Levels
- ☐ Impact Noise
- ☐ Inability to Maintain Communication
- ☐ Inclement Weather
- ☐ Overhead Work
- ☐ Overhead Utilities
- ☐ Underground Utilities
- ☐ Pinch Points
- ☐ Pressurized Lines
- ☐ Slips, Trips, Falls
- ☐ Sprains/Strains
- ☐ Traffic
- ☐ Underground Utilities
- ☐ Confined Space
- ☐ New or Rental Equipment
- ☐ Surface Water Run-On/Run-Off
- ☐ Odor/VOC Emissions
- ☐ Compressed Gas Cylinders
- ☐ Generated Wastes (Solids/Liquids)
- ☐ Known/Unknown Visitors
- ☐ Visibility
- ☐ New Personnel
- ☐ Hoists/Rigging/Slings/Wire Rope

- ☐ Special Operations/Instructions (Attach)
- ☐ Ergonomics

### Identify Controls

- ☐ Air Monitoring
- ☐ Barricades/Fencing/Silt Fencing
- ☐ Buddy System
- ☐ Appropriate Clothing/Monitoring of Weather
- ☐ Confined Space Procedures
- ☐ Decontamination
- ☐ Drinking Water/Fluids
- ☐ Dust abatement Measures
- ☐ Equipment Inspection
- ☐ Exclusion Zones
- ☐ Exhaust Ventilation
- ☐ Fall Protection
- ☐ Fire Extinguisher/Fire Watch
- ☐ Flotation Devices/Lifelines
- ☐ Grounds on Equipment/Tanks
- ☐ Ground Fault Interrupter
- ☐ Ground Hydraulic Attachments
- ☐ Hand Signal Communication
- ☐ Hazardous/Flammable Material Storage
- ☐ Hazardous Plant/Animal Training
- ☐ Hearing Protection (Specify)
- ☐ Hoses, Access to Water
- ☐ Hot Work Procedures
- ☐ Insect Repellent or Precautions
- ☐ Isolation of Equipment or Process (LO/TO)
- ☐ Stormwater Control Procedures/Methods
- ☐ Machine/Equipment Guarding
- ☐ Manual Lifting Equipment (Chain Falls)
- ☐ Protective Equipment (Specify)
- ☐ Proper Lifting Techniques
- ☐ Proper Tool for Job
- ☐ Radio Communication
- ☐ Respirator, (Specify Type)
- ☐ Safety Harness/Lanyard/Scaffold
- ☐ Sloping, Shoring, Trench Box
- ☐ Vehicle Inspection
- ☐ Spill Prevention Measures/Spill Kits
- ☐ Equipment Manuals/Training
- ☐ Emergency Procedures/Incident Management Plan
- ☐ Appropriate Labels/Signage

- ☐ Derived Waste Management Plan
- ☐ Visitor Escort/Orientation/Security
- ☐ Window Cleaning/Defrost
- ☐ Proper Work Position/Tools

### Pre-Task Review (Yes/No/NA)

1. Has Job Hazard Analysis been completed and reviewed? \_\_\_\_\_
2. Is Job Scope understood by all Personnel? \_\_\_\_\_
3. Proper Safety Equipment on job site? \_\_\_\_\_
4. Permit Issued? \_\_\_\_\_  
What type?  
☐ Hot Work    ☐ Confined Space  
☐ Excavation    ☐ Other: \_\_\_\_\_
5. Proper Tools for Job on site? \_\_\_\_\_
6. Oxygen/Flammability checked? \_\_\_\_\_
7. Reviewed MSDSs for any hazardous substance that might be present? \_\_\_\_\_
8. Proper training for all personnel? \_\_\_\_\_
9. Are there any planned deviations from set procedures for equipment modifications? \_\_\_ If so, contact supervisor to check applicability of MOC procedures.
10. Is there any work planned that could cause activation of emergency procedures? \_\_\_\_\_  
If so, have these procedures been discussed and communicated?

### Post-Task Review

1. Work area cleaned up? \_\_\_\_\_
2. All locks and tags removed and signed off by individuals? \_\_\_\_\_
3. Have Permits been turned in? \_\_\_\_\_
4. STAR submitted to EHS Department? \_\_\_\_\_
5. Were there any unplanned deviations from set procedures or equipment modifications? \_\_\_\_\_  
If so, contact supervisor to check applicability of MOC procedures.



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**SECTION 01450  
QUALITY CONTROL**

**PART 1 - GENERAL**

**1.01 SECTION INCLUDES:**

- A. Submittals
- B. Quality Control Organization
- C. Contractor Responsibilities
- D. The Engineer's Responsibilities
- E. Storage and Protection
- F. Materials and Equipment
- G. Product Options
- H. Substitutions
- I. Laboratory and Testing Requirements

**1.02 SUBMITTALS:**

- A. Contractor shall submit one copy of all testing results, quality control reports, and other quality control documentation to the Engineer. The documentation submitted shall be clearly marked as to whether or not the test results meet the requirements of the Specifications.
- B. Contractor's Daily Construction Report, as required by Section 01320 – Construction Progress Documentation, shall include daily reporting of quality control information and issues.

**1.03 QUALITY CONTROL ORGANIZATION:**

- A. Contractor's Project Superintendent shall be responsible for coordinating all quality control tests performed by Contractor during the Work, including testing of Work or materials of Contractors and Suppliers.

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**SECTION 01450**  
**QUALITY CONTROL**

- B.** Contractor's Project Superintendent shall report directly to the Engineer with regard to quality control issues.
- C.** Corrective action shall be undertaken by the Contractor for all Work and test results that do not meet Specifications. Testing shall be repeated at Contractor's cost until satisfactory results are obtained or Contractor shall correct the Work. The Engineer will determine when results are satisfactory. All results shall be made available to the Engineer for review.

**1.04 CONTRACTOR RESPONSIBILITIES:**

- A.** Contractor shall be responsible to obtain and pay for the services of independent laboratories or testing service companies to perform the following testing:
  - 1.** Quantitative field density testing and lab compaction testing to document compaction of Backfilling and Grading Work.
  - 2.** Geotechnical analysis of soil materials as required in Section 02300 – Backfilling and Grading.
  - 3.** Any other tests required by the Specifications or Change Orders.
- B.** Contractor shall be responsible for collecting samples of treated ISS columns as directed by the Engineer.
- C.** Contractor's Project Superintendent shall control the Work to the extent necessary to achieve specified quality and ensure conformance with the Contract Documents.
- D.** Contractor's Project Superintendent shall receive testing results and shall ensure that appropriate corrections, including rework if necessary, are made by Contractor.
- E.** Contractor's Project Superintendent shall ensure that emissions of dust and odors do not exceed the applicable Action Levels described in the CAMP during performance of the Work, and shall take immediate corrective measures, including stopping work, whenever emissions or excessive odors are observed.
- F.** Contractor's Project Superintendent shall ensure that all materials meet the requirements of the applicable Specifications.

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## **SECTION 01450 QUALITY CONTROL**

### **1.05 THE ENGINEER'S RESPONSIBILITIES:**

- A.** The Engineer's control of the Work will include authority for on-the-spot stopping or slowing of Work if it does not conform to quality control or Specification standards. The Engineer's control of the Work will be through Contractor's Project Superintendent.
- B.** The Engineer will have authority to instruct Contractor to immediately stop work if dust emissions, excessive odors or vapors are detected at any time, or if, in the Engineer's opinion, there exists any imminent threat to the health or safety of any person. The Engineer's authority to stop the Work shall not relieve Contractor of the sole responsibility for observation and control of emissions, and for health and safety.
- C.** The Engineer will be responsible for reviewing all quality control data generated by the Contractor. The Engineer's review of data does not relieve Contractor of the responsibility to ensure that all Work conforms to the Specifications.
- D.** The Engineer will be responsible for analyzing treated ISS QC Samples.

### **1.06 STORAGE AND PROTECTION**

- A.** Contractor shall:
  - 1.** Store and protect products and materials in accordance with manufacturers' instructions.
  - 2.** Store products and materials with seals and labels intact and legible.
  - 3.** Provide any necessary sheds or enclosures. Store sensitive products in weather-tight, climate controlled enclosures in an environment favorable to product.
  - 4.** For exterior storage of fabricated products, place on sloped supports above ground.
  - 5.** Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
  - 6.** Provide personnel and equipment to remove products from delivery trucks.
  - 7.** Arrange storage of products to permit for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

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**SECTION 01450**  
**QUALITY CONTROL**

8. Fuel storage and dispensing shall be per Section 01500.

**PART 2 - PRODUCTS**

**2.01 MATERIALS AND EQUIPMENT**

- A. Contractor shall provide all materials and equipment necessary for the Work unless otherwise specified.

**2.02 PRODUCT OPTIONS**

- A. Products Specified by Reference Standards or by Description Only: Any product meeting those standards or descriptions will be acceptable.
- B. Products Specified by Naming One or More Manufacturers: Products of manufacturers named and meeting specifications; no options or substitutions allowed.
- C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions or Equal Products: Submit a written request for substitution for any manufacturer not named in accordance with the following article.

**2.03 SUBSTITUTIONS**

- A. Contractor shall document each request for substitution with complete data substantiating compliance of proposed substitution with the requirements of the Contract Documents.
- B. Request for substitution constitutes a representation that the Contractor:
1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.
  2. Shall provide the same warrantee for the substitution as for the specified product.
  3. Shall coordinate installation and make changes to other Work as may be required to make the Work complete, with no additional cost to Owner or the Engineer.
  4. Waives claims for additional costs or time extension that may subsequently become apparent.

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**SECTION 01450**  
**QUALITY CONTROL**

- 5. Shall reimburse the Engineer for review or redesign services associated with re-approval by authorities.
- C. Substitutions will not be considered when they are indicated or implied on shop drawings or product data submittals, without separate written request, or when acceptance will require revision to the Construction Subagreement Documents.
- D. Substitution Submittal Procedure:
  - 1. Submit three copies of request for substitution. Each request shall be limited to one proposed substitution.
  - 2. Submit shop drawings, product data, and certified test results attesting to the proposed product equivalence. Burden of proof is on the Subcontractor.
  - 3. The Engineer will notify Contractor in writing of decision to accept or reject request.

**PART 3 - EXECUTION**

**3.01 LABORATORY AND TESTING REQUIREMENTS:**

- A. All laboratories and testing companies selected by Contractor shall be:
  - 1. Certified by the State of New York, if certification for such testing is available.
  - 2. Accepted by the Engineer prior to performing any analyses.
  - 3. Organizations, independent from the Contractor and Subcontractors, unless prior written approval is received from the Engineer.

**END OF SECTION**

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**SECTION 01500**  
**MOBILIZATION AND TEMPORARY FACILITIES****PART 1 – GENERAL****1.01 SECTION INCLUDES:**

- A.** Electric Service
- B.** Water Service
- C.** Temporary Sanitary Facilities
- D.** Traffic Control Signs
- E.** Work Zones
- F.** Enclosures and Fencing
- G.** Protection of the Work
- H.** Temporary Erosion and Sediment Controls
- I.** Haul Roads and Access Roads
- J.** Parking
- K.** Progress Cleaning and Waste Removal
- L.** Stockpile Areas
- M.** Field Offices and Sheds
- N.** Removal and Restoration of Utilities, Facilities, and Controls
- O.** Fuel Storage and Dispensing

**1.02 ELECTRIC SERVICE:**

- A.** A licensed electrician shall perform all electrical Work.
- B.** Contractor shall furnish and install electrical and telephone service to all Field Offices, including Engineer's field office, NYSDEC field office and any other location Contractor deemed necessary to complete the Work. A single 600a, 3 phase, 480V temporary electrical service for remedial construction work at the site. The location of this service has been ordered to support the location for the ISS grout batch plant is depicted in the drawings. This service will be transferred to the Contractor prior to mobilization to the site. Contractor shall furnish and install electrical connections from main service disconnects to Contractor's facilities, equipment and to the office trailers. At a minimum the contractor will be required to coordinate and pay for power for the temporary facilities, air handling systems, batch plants, perimeter air monitoring stations and other construction activities. The temporary service shall be decommissioned by the Contractor at the end of the project.
- C.** All electrical connections shall meet appropriate NEMA ratings consistent with the intended service.
- D.** Contractor shall coordinate with local electric utility (NYSEG) and obtain any necessary inspections and permits.

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**SECTION 01500**  
**MOBILIZATION AND TEMPORARY FACILITIES****1.03 WATER SERVICE:**

- A.** Contractor shall provide, maintain, and pay for suitable quantity and quality of water service for batch plant makeup, dust control and decontamination.
- B.** Contractor shall provide water conveyance from the water service terminus to any locations on the Project Site where water is used.
- C.** A four inch diameter water service was used during the completion of Phase 1A ISS work at the site. This service was cut and capped at the limits of restoration (sidewalk along Front Street) where the service entered the site (near the southeast corner of the 41 Front Street parcel). This may be reactivated if adequate for the Contractor's use. If Contractor elects to reactive this water service Contractor shall be responsible for the reconnection and operation of the water service in accordance with project plans, project specifications and regulatory requirements. Contractor will also be responsible for the abandonment of the water service line at the end of the project.
- D.** Contractor shall provide, maintain, and pay for a suitable quantity of potable drinking water for all on-site employees. Contractor shall furnish drinking water in Contractor's field office trailer and, if necessary at other locations near the Work being conducted

**1.04 TEMPORARY SANITARY FACILITIES:**

- A.** Contractor shall provide a sufficient number of portable toilets for Contractor and Subcontractor Work crews, Engineer, Owner, and visitors in accordance with usage ratings, or as otherwise directed by the Engineer. The facilities shall be provided at time of project mobilization and maintained in clean and sanitary condition until Substantial Completion.
- B.** Contractor shall provide and maintain in clean, good working order, a water hand washing facility for personnel decontamination.
- C.** Contractor shall provide and maintain in clean, good working order an emergency decontamination and eye wash station on each side of Front Street at a minimum.
- D.** Contractor shall provide and maintain, in clean, good working order other personnel decontamination facilities required by the Contract Documents or the HASP.

**1.05 TRAFFIC CONTROL SIGNS:**

- A.** Contractor shall furnish, install, and maintain traffic control signs in accordance with requirements of the Chenango County, City of Norwich, NYSDOT, Transportation Plan,

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**SECTION 01500**  
**MOBILIZATION AND TEMPORARY FACILITIES**

the Contractor's traffic plan, and as otherwise deemed necessary by the Engineer for the safety of the public.

**1.06 WORK ZONES:**

- A.** Contractor shall establish a Secured Zone, Support Zone, Exclusion Zone, and Decontamination Zone, as defined herein.
- 1.** Contractor shall lay out the Work Zones and establish boundaries, barriers, facilities, and controls to ensure that all personnel and equipment exiting the Exclusion Zone shall pass through the Decontamination Zone before entering the Support Zone and before exiting the Project Site.
  - 2.** Contractor shall furnish, install, and maintain in good condition, orange plastic mesh fencing secured to metal posts to delineate the boundaries between Work Zones, including the Exclusion Zone, Decontamination Zone, and Support Zone and around the lined stockpile area.
- B.** Secured Zone. Contractor shall establish a general Secured Zone that excludes unauthorized personnel from entering the Project Site.
- 1.** Access to Secured Zone shall be controlled by steel chain link fence and locking gates as shown on the Drawings.
  - 3.** Contractor shall furnish locks for Secured Zone gates and provide duplicate keys to Engineer, and Owner.
  - 4.** Contractor and Engineer shall control access to the Secured Zone. The Engineer, Engineer and Owner shall be allowed free access to the Secured Zone 24 hours per day, subject to appropriate safety precautions.
  - 5.** Contractor shall maintain a log sheet on which all Contractor personnel and visitors must sign in and out upon entering or leaving the Secured Zone.
  - 6.** Contractor shall be responsible for the security and safety of equipment, facilities, personnel, and materials within the Secured Zone.
- C.** Support Zone. Contractor shall establish a Support Zone for field offices, storage, sanitary facilities, hand washing facilities, and non-construction vehicle parking.
- 1.** The Support Zone shall be an area free of physical and chemical hazards.

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**SECTION 01500**  
**MOBILIZATION AND TEMPORARY FACILITIES**

2. Contractor shall maintain the Support Zone in a safe, clean, orderly, and sanitary manner at all times.
- D.** Exclusion Zone. Contractor shall establish an Exclusion Zone within the Secured Zone using the following criteria and other criteria deemed necessary by the Engineer:
1. Open excavation areas shall be included in the Exclusion Zone.
  3. Impacted Material stockpile area shall be designated an Exclusion Zone.
  4. Consideration of meteorological conditions and the potential for contaminants or other materials to be blown or washed from the area.
  5. OSHA Regulations and other applicable Laws and Regulations.
- E.** Temporary Activity Zones within Exclusion Zone. Contractor shall establish Temporary Activity Zones within the Exclusion Zone using high-visibility warning tape fastened to metal posts or weighted barrels to delineate areas where specific Work tasks will take place. Temporary Activity Zones shall be revised as necessary and as the Work progresses. Temporary Activity Zones shall be established to include the following tasks:
1. Excavation: Excavation areas shall be marked with yellow or orange caution tape at all times.
  2. Stockpiling: Stockpile areas (i.e., unimpacted stockpiles, import material stockpiles) shall be established as Temporary Activity Zones and signs installed to indicate the type of material stockpiled in each stockpile area. Signs may consist of high visibility spray paint on the plastic membrane stockpile cover.
  3. Storage: Storage areas for materials or equipment shall be established and maintained as Temporary Activity Zones.
  4. Batch Plant for ISS slurry.
  5. Decontamination: Any temporary decontamination areas shall be marked as Temporary Activity Zones.
- F.** Decontamination Zone. Contractor shall establish a Decontamination Zone between the Support Zone and the Exclusion Zone.
1. Contractor shall provide suitable facilities for personnel decontamination in the Decontamination Zone, including emergency eyewash, hand washing, and shower facilities.

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**SECTION 01500**  
**MOBILIZATION AND TEMPORARY FACILITIES**

2. Contractor shall construct a vehicle and equipment decontamination facility, which shall allow for containment and collection of liquid and solid residuals from decontamination of construction vehicles and trucks bound for off-site disposal.
3. Contractor shall inspect and document inspection of each truck bound for disposal of Impacted Soil and debris. Contractor shall inspect all vehicles and equipment that have been in the Exclusion Zone prior to exiting the Exclusion Zone. Contractor shall remove loose mud and debris from all vehicles that have been in the Exclusion Zone prior to movement of equipment between the Exclusion Zone and Non-Exclusion Zone areas of the Secured Zone.
4. Contractor shall provide splash protection around the vehicle decontamination facility. Splash protection shall minimize potential contamination from splatter and mist during the vehicle and equipment decontamination process. Splash protection shall be temporary, but stable, and capable of being dismantled in the event of high winds.
5. Contractor shall provide a drainage and collection system for wastewater generated during decontamination procedures.

**1.07 ENCLOSURES AND FENCING:**

- A. Contractor shall furnish, install, and maintain all other proposed temporary fencing, gates and barriers around impacted areas as required by the Contract Documents and to complete the Work.
- B. Contractor shall furnish and post signs at every entrance and gate and at least every 50 feet along the fence warning the general public that the Project Site contains physical and chemical hazards and that access is forbidden to unauthorized persons.
- C. Contractor shall furnish and post a professionally lettered sign, minimum size 4 feet by 4 feet, at each entrance, or gate to the site with the following text, or other similar text approved by the Engineer.

“NYSDEC Order on Consent No. DO-0002-9309” in compliance with the NYSDEC specifications”

**1.08 PROTECTION OF THE WORK:**

- A. Contractor shall protect installed Work and provide special protection with regard to preventing the spread of residuals to areas outside the Exclusion Zone.

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**SECTION 01500**  
**MOBILIZATION AND TEMPORARY FACILITIES**

- B.** Contractor shall protect the existing buildings, trees, shrubs, sidewalks, driveways, streets, catch basins, manholes, subsurface facilities, curbs, and gutters by such means as determined by Contractor to be adequate for such protection, unless such facilities are designated on the Drawings for removal. Contractor shall repair or replace any existing buildings, trees, shrubs, sidewalks, driveways, streets, catch basins, manholes, subsurface facilities, curbs, or gutters that are cracked, broken, or otherwise damaged by Contractor, to its original condition, or better, in accordance with City of Norwich and NYSDOT requirements.

**1.09 TEMPORARY EROSION AND SEDIMENT CONTROLS:**

- A.** Contractor shall remove all soil, mud, and residuals from vehicle wheels, fenders, and tailgates before exiting to public streets.
- B.** The Contractor shall provide, install, and maintain all required sediment and erosion controls as specified in Specifications Section 01570 – Erosion and Sediment Controls.

**1.10 HAUL ROADS AND ACCESS ROADS:**

- A.** Contractor shall furnish, construct, and maintain on-site haul and access roads as designated on the Drawings, or as necessary to complete the work with Engineer's approval.

**1.11 PARKING:**

- A.** Engineer shall designate a parking area to accommodate personal vehicles of Contractor employees, Engineer, Owner, and visitors. Construction vehicles shall not be allowed in the areas designated for parking personal vehicles.
- B.** Contractor shall designate an area of the Secured Zone to be used for parking and maintenance of construction vehicles and equipment.

**1.12 PROGRESS CLEANING AND WASTE REMOVAL:**

- A.** Contractor shall maintain all Work areas free of waste materials, debris, and rubbish, maintain the Work site in a clean and orderly condition, and collect and remove waste materials, debris, and rubbish from the Work site weekly and dispose off-site.

**1.13 STOCKPILE AREAS:**

- A.** The Stockpile and Staging Area will be constructed by the Contractor. The Contractor shall maintain these facilities during the course of the Work, modify them as required to implement the Work, and remove them when the Work is complete.

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**SECTION 01500**  
**MOBILIZATION AND TEMPORARY FACILITIES**

- B.** Contractor shall establish individual stockpiles within the stockpile area as necessary for coordination of excavation of non-impacted soils subject to sampling and analysis for potential reuse onsite as backfill.

**1.14 FIELD OFFICES AND SHEDS:**

- A.** General requirements for all sheds and offices shall be as follows:
- 1.** Structurally sound, weather tight, with floors raised above ground, with hurricane tie-down straps.
  - 2.** Thermal insulation compatible with occupancy and storage requirements.
- B.** The Contractor shall furnish and maintain a field office for the use of Contractor. Field office shall be at a location coordinated with the Owner and Engineer, during the entire period of Work.
- C.** Contractor shall furnish and maintain field offices for use of the Engineer, Owner's Air Monitoring Contractor, Owner and NYSDEC at the Project Site, at a location coordinated with the Owner and Engineer, during the entire period of Work.
- 1.** Field offices shall be located in the Support Zone.
  - 2.** Field offices shall be of a size, construction, and outfitted in a manner customary to such facilities at similar construction sites. Trailers may be sized as proposed by Contractor and approved by Engineer but must accommodate separate office space at a minimum of 12' x 15' in dimension for each the Engineer/NYSDEC and Owner.
  - 3.** Field offices shall be furnished with appropriate fire extinguishers, first aid supplies, and office supplies.
  - 4.** Each separate field office will require (1) phone, (1) high speed data (hard line) connections. Supply of wireless modem for entire trailer/ support area will not be considered a substitute; minimum of one hard line shall be installed in each trailer.

**1.15 REMOVAL AND RESTORATION OF UTILITIES, FACILITIES, AND CONTROLS:**

- A.** Contractor shall remove temporary utilities, equipment, and construction facilities, prior to submitting final Application for Payment, including those provided or installed by Others unless specifically identified for removal by Others.

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**SECTION 01500**  
**MOBILIZATION AND TEMPORARY FACILITIES**

- B.** Contractor shall remove from the Work site all materials, equipment, vehicles, construction facilities, temporary controls, rubbish, debris, and wastes.
- C.** Contractor shall dismantle and remove from the Project Site, as directed by the Engineer, any temporary fencing installed by the Contractor.

**1.16 FUEL STORAGE AND DISPENSING:**

- A.** Contractor shall store fuel on site only in approved containers that meet all relevant fire codes.
- B.** Contractor shall provide secondary containment and spill protection devices at all onsite fueling facilities.
- C.** Extreme care shall be taken to prevent fuel spills. Contractor's representative shall be present at all time when equipment is being fueled. Subcontractor shall notify the Engineer, the local Fire Department and other authorities as required in the event of a spill. Contractor shall be prepared and shall provide personal equipment and materials to immediately respond to fuel spills, and is responsible for all costs of containing, removing and disposing of materials contaminated by fuel spills.
- D.** Contractor shall provide and maintain absorbent materials, shovels, containers and other appropriate materials for spill response and cleanup. Cleanup materials shall be appropriate for the type of fuels, oils and other materials used.
- E.** Contractor shall not commingle waste materials caused by fueling or vehicle maintenance activities with excavated contaminated soil or with impacted water generated by the Work.
- F.** Contractor shall dispose of waste materials caused by fueling at no expense to the Owner.

**PART 2 – PRODUCTS**

Not Used.

**PART 3 – EXECUTION**

Not Used.

**END OF SECTION**

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## **SECTION 01570 EROSION AND SEDIMENT CONTROL**

### **PART 1 – GENERAL**

#### **1.01 SECTION INCLUDES:**

- A. Performance Requirements
- B. Products
- C. Surface Water Run-on/Run-off Control
- D. Inspection and Maintenance

#### **1.02 PERFORMANCE REQUIREMENTS:**

- A. Permits and Approvals: The Engineer will obtain any necessary permit equivalents and approvals for erosion and sediment control.
- B. Compliance: Contractor shall be responsible for compliance with requirements of any and all permit equivalents and approvals.
- C. Implementation: Contractor shall employ the following general procedures, and other procedures as required by all regulations:
  - 1. Run-on Controls: Contractor shall use ditches, berms, pumps, and other methods necessary to divert and drain surface water away from excavations and other Work areas.
  - 2. Sediment Controls:
    - a. The sediment and erosion control structures shown on the Drawings shall be installed by the Contractor. The Contractor shall inspect and maintain these facilities in accordance with the Contract Documents.
    - b. Contractor shall take necessary precautions and implement best management practices to prevent sediment from entering roadways, storm sewers, catch basins, or surface water.
- D. Stockpile Management. Contractor shall manage stockpiles in accordance with Specifications Section 01500 – Mobilization and Temporary Facilities.
- E. Street Cleanliness:
  - 1. Where construction vehicle access routes intersect public roads, Contractor shall make provisions to mitigate the transport of mud, spoils, soil, or dust onto the public road. Contractor shall construct haul roads with necessary controls to prevent soil transport to public streets. If soil, spoils, mud, or dust is transported

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**SECTION 01570**  
**EROSION AND SEDIMENT CONTROL**

onto a road surface, Contractor shall immediately clean the road thoroughly. Contractor shall remove soil from the roads by shoveling or sweeping and sweepings shall be transported to an on-site soil stockpile area. Street washing with water shall be allowed only after soil is removed to the extent practical by sweeping.

- F. Control of Pollutants Other than Soil/Mud/Dust/Sediment:
1. All pollutants that occur on the Project Site during construction shall be handled and disposed in a manner that does not impact stormwater runoff.
  2. Fueling of Contractor's equipment shall be performed away from storm drain inlets and catch basins.

**PART 2 – PRODUCTS****2.01 SILT FENCE**

- A. Silt fence shall be as detailed in the Drawings, or equivalent.

**2.02 HAY BALES**

- A. Hay bales shall be installed by the Contractor at the Engineer's discretion, and as detailed in the Drawings.

**PART 3 – EXECUTION****3.01 SURFACE WATER RUN-ON/RUN-OFF CONTROL:**

- A. Contractor shall intercept surface water and divert it away from excavations and Work areas through use of dikes, ditches, curb walls, pipes, sumps, or other Construction Manager's-approved means. The requirement includes temporary measures as required to protect adjoining properties from surface drainage caused by construction operations.
- B. Contractor shall prevent surface water run-on/run-off from transporting sediment or other contaminants off site. Any stormwater coming into contact with contaminants shall be stored on-site and shipped off-site for disposal. Should, in the opinion of the Construction Manager, the Contractor fail to provide adequate run-on controls, all costs related to the collection, storage and disposal of the resulting impacted storm water shall be the responsibility of the Contractor.



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**SECTION 01570**  
**EROSION AND SEDIMENT CONTROL**

**3.02 INSPECTION AND MAINTENANCE:**

- A. Contractor shall inspect and repair or replace damaged components of temporary erosion and sediment controls weekly including those installed by Others. Inspection and repairs shall be conducted immediately after rain or flooding events, and inspection and repairs shall be conducted at least once each day during prolonged rain events.
- B. Contractor shall remove sediment deposits and place them in designated spoil areas. Sediment shall not be allowed to migrate off site. If sediment has been in contact with contaminated materials, it shall be incorporated into material to be disposed or further characterized to determine appropriate disposition.
- C. Contractor's equipment and vehicles are prohibited from maneuvering on areas outside of dedicated rights-of-way and easements for construction.
- D. Damage to erosion and sediment control systems shall be repaired immediately.

**END OF SECTION**

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**SECTION 01720**  
**SURVEYING****PART 1 – GENERAL****1.01 SECTION INCLUDES:**

- A. Submittals
- B. Examination
- C. Survey Reference Points
- D. Survey Requirements

**1.02 SUBMITTALS:**

- A. Contractor will provide a Land Surveyor licensed in the State of New York.
- B. Contractor will submit all field notes, computations, data logger information, and other survey records for the purposes of layout of the Work, or payment quantity estimation, or for final documentation of the Work to the Engineer on a daily basis.
- C. Contractor will maintain and submit all survey data and survey Drawings as Record Documents.

**1.03 EXAMINATION:**

- A. Contractor shall verify locations of survey benchmarks shown on the Drawings prior to starting Work.
- B. Contractor shall promptly notify the Engineer of any discrepancies discovered.

**1.04 SURVEY REFERENCE POINTS:**

- A. Contractor's surveyor will establish temporary benchmark(s) and horizontal control for the Work.
- B. Contractor shall locate and protect survey control and reference points during construction.

**PART 2 – PRODUCTS**

Not Used.

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**SECTION 01720**  
**SURVEYING****PART 3 – EXECUTION****3.01. SURVEY REQUIREMENTS:**

- A.** The Contractor's Land Surveyor will conduct an initial survey of boundaries for limits of excavations and ISS Treatment as shown on the Drawings. This survey shall utilize recognized engineering survey practices appropriate for obtaining the information specified. The Contractor shall conduct additional layout survey during the Work as needed to ensure that the Work performed is to the limits shown of the Drawings.
- B.** Upon final completion and approval of the project the contractor shall supply the engineer the required as-built drawing documentation as described below in AutoCAD format:
  - 1.** Drawing file(s) showing limits of all final restoration elements
  - 2.** Drawing file(s) showing limits, depth, invert elevation and sizes of all restored utilities
  - 3.** Drawing file(s), containing contours (0.5 ft. interval) and corresponding survey points and DTM files showing each of the following surfaces:
    - a.** Final Grading
    - b.** Top of Monolith
- C.** Surveying personnel shall be in full compliance with all requirements of CFR.1910.120 before entering the Exclusion Zone.
- D.** Contractor shall preserve the survey stakes, including replacement by a Registered Land Surveyor, at Contractor's expense, if destroyed or moved.
- E.** During the course of the Work, the Contractor will record final locations and elevations of all excavation work when complete in each area.
- F.** During the course of the backfilling and site restoration Work, the Contractor will record elevations and locations in completed working areas for each restoration material used.
- G.** Contractor shall promptly report to Engineer the loss or destruction of any reference point or relocation required because of changes in grades or other reasons. Contractor shall make no changes without prior written notice to the Engineer.
- H.** The Work shall be executed in conformance with the lines and grades shown on the Drawings, unless otherwise approved by the Engineer.

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**SURVEYING**

- I.** If the Engineer believes that Contractor constructed the ISS Treatment outside the limits shown on the Drawings in certain areas, Work in that area shall be temporarily discontinued upon notification to Contractor. The Contractor may then employ a Registered Land Surveyor to determine actual elevations and locations of excavation.
- J.** At the end of construction, the Contractor's surveyor shall prepare Record Drawings as required by Owner and Engineer.

**END OF SECTION**

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## **SECTION 01725 WELL PROTECTION AND ABANDONMENT**

### **PART 1 - GENERAL**

#### **1.01 SECTION INCLUDES:**

- A.** Condition of Wells
- B.** Well Protection
- C.** Well Repair and Replacement
- D.** Well Abandonment

#### **1.02 CONDITION OF WELLS:**

- A.** Monitoring well locations and designations are shown in the Drawings.
- B.** Subcontractor shall not inject or place any objects in the wells.

#### **1.03 REFERENCES**

- A.** The most recent version of the following document is incorporated into this Specification.
  - 1.** NYSDEC commissioner policy CP-43 – Groundwater Monitoring Well Decommissioning Policy (NYSDEC, 2009).

### **PART 2 – PRODUCTS**

Not Used.

### **PART 3 – EXECUTION**

#### **3.01 WELL PROTECTION:**

- A.** Subcontractor shall be responsible for the protection of all wells located outside the horizontal limits of excavation and shown on the Drawings.
- B.** Subcontractor shall determine appropriate construction methods and means of well protection, which may include hand excavation in areas immediately adjacent to wells.

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**SECTION 01725****WELL PROTECTION AND ABANDONMENT**

- C. The Subcontractor may convert any aboveground wells, which are at risk of damage to flush-mount wells. Flush mount construction shall include a steel valve cover box with a cover secured by bolts, installed in a 2-foot by 2-foot concrete pad. The well pipe shall be capped by a lockable expanding well cap. The Subcontractor shall establish and survey a new reference elevation for the top of the well casing, based on the local elevation reference system established for the site.

**3.02 WELL REPAIR AND REPLACEMENT:**

- A. If any well designated to be protected becomes damaged, as determined by the Engineer, as a result of the Work, Subcontractor shall repair the damaged well to the original construction standards at the Contractor's sole expense.
- B. Any well repair, abandonment, or replacement shall be completed in conformance with NYSDEC commissioner policy CP-43 – Groundwater Monitoring Well Decommissioning Policy (NYSDEC, 2009).

**3.03 WELL ABANDONMENT**

- A. All wells shown on the Drawings located within the horizontal limits of ISS Treatment shall be abandoned in accordance with the requirements of NYSDEC commissioner policy CP-43 – Groundwater Monitoring Well Decommissioning Policy (NYSDEC, 2009).
- B. The Contractor shall prepare and submit all required documentation for well abandonment.

**END OF SECTION**



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## **SECTION 01770 CLOSEOUT PROCEDURES**

### **PART 1 – GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Submittals
- B. Final Cleanup
- C. Contract Closeout Procedures

#### **1.02 SUBMITTALS**

- A. Contractor shall submit the following in accordance with the Specifications Section 01330 – Submittal Procedures:
  - 1. Contractor shall submit a written statement that the Work has progressed to Substantial Completion.
  - 2. Contractor shall submit a written request for a final inspection after Contractor has determined that the Work is complete in all respects.
  - 3. Contractor shall submit Project Record Documents as described in Specifications Section 01320 – Construction Progress Documentation.
  - 4. Contractor shall submit a final Application for Payment.
  - 5. Contractor shall submit a closeout report.

### **PART 2 – PRODUCTS**

Not used.

### **PART 3 – EXECUTION**

#### **3.01 FINAL CLEANUP**

- A. Upon completion of the Work and before final inspection, Contractor shall clean the entire Work premises occupied or used in connection with the Work of all rubbish, surplus, and discarded materials, temporary facilities and controls, equipment, and debris. The entire Work premises shall be left in a clean, neat, and presentable condition.

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**SECTION 01770**  
**CLOSEOUT PROCEDURES****3.02 CONTRACT CLOSEOUT PROCEDURES**

- A. Contract closeout procedures shall take place in the following order:
1. The Engineer will perform the final inspection.
  2. If necessary, the Engineer shall prepare a punch list of Work items to be completed and transmit a copy of the punch list to Contractor.
  3. Contractor shall complete all punch list items expeditiously to the satisfaction of the Engineer.
  4. Contractor shall submit final Application for Payment to the Engineer identifying total adjusted Contract Price, previous payments, and amount remaining to be paid.
  5. Contractor shall submit Application for Payment for retainage with required affidavits.
  6. Contractor shall submit a Project closeout report that shall include:
    - a. Description of remediation activities, including total work quantities.
    - b. Variations from the Drawings, Plans and Specifications.
    - c. Discussion of major problems encountered and the resolutions.
    - d. Accident Injury Report summary.
    - e. Complete list of all Contractor personnel on the Site during completion of the work.
    - f. As-Built Record Drawings from a surveyor licensed in the State of New York.

**END OF SECTION**

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**SECTION 02114**  
**STOCKPILING, AMENDING, AND LOADING SOIL****PART 1 – GENERAL****1.01 SECTION INCLUDES:**

- A. Summary
- B. Submittals
- C. Reference
- D. Materials
- E. Stockpiling – General
- F. Stockpile Construction
- G. Stockpile Management
- H. Stockpile Inspection
- I. Amending
- J. Loading
- K. Stockpile Removal

**1.02 SUMMARY:**

- A. Section includes on-site temporary stockpiling, amending, and loading of removed impacted materials for off-site transport.
- B. Related Sections:
  - 1. Section 01570 - Erosion and Sediment Control
  - 2. Section 02260 – Excavation
  - 3. Section 02120 – Off-Site Transportation and Disposal
  - 4. Section 02130 - Decontamination



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## **SECTION 02114**

### **STOCKPILING, AMENDING, AND LOADING SOIL**

#### **1.03 SUBMITTALS:**

- A. Contractor shall submit plan for temporary stockpiling soil. Stockpile locations and construction to be submitted to Engineer for review and approval.

#### **PART 2 – PRODUCTS**

##### **2.01 MATERIALS:**

- A. Furnish all materials required for construction and maintenance of stockpiles.
- B. Stockpile bottom liners shall have a minimum thickness of 20 mils and shall consist of polyethylene or other impermeable geomembrane that is resistant to weathering and degradation due to contact with impacted materials for the duration of the Work. Liner shall be furnished with prefabricated shop welded seams, if required, and dimensions maximized to provide the largest manageable sheet.
- C. Stockpile cover sheets shall be of sufficient length and width to cover each stockpile with no more than two sheets.
- D. Stockpile covers and liners shall be free of holes or tears. Defective material shall be repaired or replaced, as determined by Engineer.
- E. Furnish sand bags or other weights of sufficient quantity and weight to hold the stockpile cover in position. Stockpile materials shall not be used as cover weights.
- F. Contractor shall furnish soil additives to be used as the amending material for mixing with impacted soils to allow disposal at a subtitle D non-hazardous landfill.

##### **2.02 LIME**

- A. The Contractor shall provide soil amendments that contain less than 50% free Lime as required by NYSDEC

#### **PART 3 – EXECUTION**

##### **3.01 STOCKPILING – GENERAL:**

- A. Coordinate stockpiling and loading work with excavation and ISS work.

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**SECTION 02114**  
**STOCKPILING, AMENDING, AND LOADING SOIL**

- B. Establish separate stockpiles as necessary for management of excavated materials prior to transport of excavated materials for off-site disposal and stockpiling for potential onsite reuse.
- C. Stockpiles placed on ISS working platforms or yet to be excavated areas shall not require bottom liner, but berming and leachate control shall still be required.
- D. Contractor shall be responsible for constructing all stockpiles, furnishing all waste containers, and for inspection, maintenance, modification and repair of stockpiles and waste containers required for the Work.
- E. Line and cover impacted material stockpiles, provide runoff and runoff controls, manage all liquids that drain from stockpiles, and prevent precipitation, stormwater, and surface water from contacting materials contained in the stockpiles as specified in this Section.
- F. Locate and construct impacted material stockpiles as approved by Engineer.
- G. Determine the need for impacted material temporary stockpiles based on the sequencing of the Work and required rates of loading trucks. Exert the highest standard of care with respect to stockpiling impacted materials.
- H. Contractor shall be responsible to control odors from stockpiles.
- I. Stockpile shall not exceed 15 feet in height. Side slopes shall not exceed a slope of 1 horizontal to 1 vertical (1H:1V).
- J. Soils that have been amended by addition of admixtures shall be stockpiled separately. Contractor shall not mix or commingle amended materials with soils that have not been amended.

**3.02 STOCKPILE CONSTRUCTION**

- A. Prepare area for stockpile construction. Remove hard stones and other debris from the stockpile footprint and provide a smooth surface to protect the bottom liner from puncture and tearing under anticipated loading.
- B. Install stockpile cover in a manner that minimizes wrinkles. Overlap adjacent panels of polyethylene sheeting a minimum of 4 feet. Place sandbags or other approved ballast on the cover to prevent uplift from wind. Ballast shall be placed along all edges and overlaps at spacing no greater than 10 feet apart.
- C. Protect the cover from damage. Remove and replace damaged polyethylene sheeting as directed by the Engineer.



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**SECTION 02114**  
**STOCKPILING, AMENDING, AND LOADING SOIL****3.03 STOCKPILE MANAGEMENT:**

- A. Impacted materials shall be placed only in properly constructed and maintained stockpiles. Do not place any designated non-impacted materials in the impacted material stockpiles.
- B. Prevent impacted soil dust from becoming airborne. Place and anchor stockpile covers at the completion of each workday and during periods of rain or wind. Cover the stockpiles whenever the stockpiles are not being used.
- C. Provide run-on controls to divert storm water away from stockpiles. Collect accumulated leachate from lined stockpile areas and manage the water as necessary for discharge to on-site treatment system as directed by Engineer.
- D. Contractor shall minimize vehicular traffic on the cover and liner.
- E. Stockpiles shall be managed to prevent the emission of dust, vapors, or odors.
- F. Stockpiles shall be managed to prevent soil erosion or sedimentation in accordance with Section 01570.

**3.04 STOCKPILE INSPECTION:**

- A. Engineer may inspect impacted material stockpiles to verify the integrity of the stockpile liner and cover system.
- B. All deficiencies noted by Engineer shall be immediately corrected to the satisfaction of Engineer. If necessary, stockpiled material shall be relocated to another impacted material stockpile so that repairs can be made.
- C. The Contractor shall inspect each stockpile daily for damage and immediately repair any deficiencies encountered.

**3.05 AMENDING:**

- A. In the course of the excavation, saturated material may be encountered, which may be deemed by the Engineer unsuitable for shipment for disposal. At the direction of the Engineer, Contractor shall amend this soil.
- B. The Contractor shall amend soil with soil additives containing less than 50% free Lime.

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**SECTION 02114**  
**STOCKPILING, AMENDING, AND LOADING SOIL**

- C. Contractor shall thoroughly mix soil additives to the saturated soil. If possible, this mixing should be performed within the excavation area where the saturated soil is encountered.
- D. Contractor may dispose of the amended soils off-site upon approval from the Engineer.

**3.06 LOADING:**

- A. The Contractor shall prepare and load all trucks and containers for transport and disposal of materials excavated from the Site as specified in the following paragraphs.
- B. Coordinate with the selected waste hauler to furnish all vehicles and containers required for transportation of materials from the Site as specified in Section 02120.
- C. Visually inspect and decontaminate the exterior of all vehicles and containers in compliance with all applicable regulations and Section 02130.
- D. Coordinate loading operations and hours with the operating hours of the disposal facilities identified in Section 02120.
- E. Load all trucks carefully to prevent spills. Stage trucks within the remediation area so that spills shall be contained within the area and easily removed. If required by Engineer, spread polyethylene sheeting over an area sufficient for truck loading.
- F. Contractor shall be solely responsible for proper loading of, and abiding by the load limits and weight limits for, all vehicles leaving the Site. All fines, taxes, penalties or judgments resulting from overweight or improperly loaded vehicles shall be the Contractor's responsibility.
- G. Track-mounted equipment shall undergo decontamination per Section 02130 prior to leaving the Exclusion Zone.
- H. Transportation shall be per Section 02120.
- I. Contractor shall be responsible for ensuring that all material loaded for off-site disposal meets paint filter criteria in accordance with all applicable transportation laws and regulations and the requirements of the receiving landfill.

**3.07 STOCKPILE REMOVAL:**

- A. After removal and relocation or disposal of stockpiled materials, the Contractor shall remove the geomembrane bottom liner and top cover from the stockpile area(s) and

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**STOCKPILING, AMENDING, AND LOADING SOIL**

dispose at the designated off-site disposal facility with the impacted soil and debris at the completion of the Work.

**END OF SECTION**

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**SECTION 02114**  
**STOCKPILING, AMENDING, AND LOADING SOIL****PART 1 – GENERAL****1.01 SECTION INCLUDES:**

- A. Summary
- B. Submittals
- C. Reference
- D. Materials
- E. Stockpiling – General
- F. Stockpile Construction
- G. Stockpile Management
- H. Stockpile Inspection
- I. Amending
- J. Loading
- K. Stockpile Removal

**1.02 SUMMARY:**

- A. Section includes on-site temporary stockpiling, amending, and loading of removed impacted materials for off-site transport.
- B. Related Sections:
  - 1. Section 01570 - Erosion and Sediment Control
  - 2. Section 02260 – Excavation
  - 3. Section 02120 – Off-Site Transportation and Disposal
  - 4. Section 02130 - Decontamination

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**SECTION 02114**  
**STOCKPILING, AMENDING, AND LOADING SOIL****1.03 SUBMITTALS:**

- A. Contractor shall submit plan for temporary stockpiling soil. Stockpile locations and construction to be submitted to Engineer for review and approval.

**PART 2 – PRODUCTS****2.01 MATERIALS:**

- A. Furnish all materials required for construction and maintenance of stockpiles.
- B. Stockpile bottom liners shall have a minimum thickness of 20 mils and shall consist of polyethylene or other impermeable geomembrane that is resistant to weathering and degradation due to contact with impacted materials for the duration of the Work. Liner shall be furnished with prefabricated shop welded seams, if required, and dimensions maximized to provide the largest manageable sheet.
- C. Stockpile cover sheets shall be of sufficient length and width to cover each stockpile with no more than two sheets.
- D. Stockpile covers and liners shall be free of holes or tears. Defective material shall be repaired or replaced, as determined by Engineer.
- E. Furnish sand bags or other weights of sufficient quantity and weight to hold the stockpile cover in position. Stockpile materials shall not be used as cover weights.
- F. Contractor shall furnish soil additives to be used as the amending material for mixing with impacted soils to allow disposal at a subtitle D non-hazardous landfill.

**2.02 LIME**

- A. The Contractor shall provide soil amendments that contain less than 50% free Lime as required by NYSDEC

**PART 3 – EXECUTION****3.01 STOCKPILING – GENERAL:**

- A. Coordinate stockpiling and loading work with excavation and ISS work.

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**SECTION 02114**  
**STOCKPILING, AMENDING, AND LOADING SOIL**

- B. Establish separate stockpiles as necessary for management of excavated materials prior to transport of excavated materials for off-site disposal and stockpiling for potential onsite reuse.
- C. Stockpiles placed on ISS working platforms or yet to be excavated areas shall not require bottom liner, but berming and leachate control shall still be required.
- D. Contractor shall be responsible for constructing all stockpiles, furnishing all waste containers, and for inspection, maintenance, modification and repair of stockpiles and waste containers required for the Work.
- E. Line and cover impacted material stockpiles, provide runoff and runoff controls, manage all liquids that drain from stockpiles, and prevent precipitation, stormwater, and surface water from contacting materials contained in the stockpiles as specified in this Section.
- F. Locate and construct impacted material stockpiles as approved by Engineer.
- G. Determine the need for impacted material temporary stockpiles based on the sequencing of the Work and required rates of loading trucks. Exert the highest standard of care with respect to stockpiling impacted materials.
- H. Contractor shall be responsible to control odors from stockpiles.
- I. Stockpile shall not exceed 15 feet in height. Side slopes shall not exceed a slope of 1 horizontal to 1 vertical (1H:1V).
- J. Soils that have been amended by addition of admixtures shall be stockpiled separately. Contractor shall not mix or commingle amended materials with soils that have not been amended.

**3.02 STOCKPILE CONSTRUCTION**

- A. Prepare area for stockpile construction. Remove hard stones and other debris from the stockpile footprint and provide a smooth surface to protect the bottom liner from puncture and tearing under anticipated loading.
- B. Install stockpile cover in a manner that minimizes wrinkles. Overlap adjacent panels of polyethylene sheeting a minimum of 4 feet. Place sandbags or other approved ballast on the cover to prevent uplift from wind. Ballast shall be placed along all edges and overlaps at spacing no greater than 10 feet apart.
- C. Protect the cover from damage. Remove and replace damaged polyethylene sheeting as directed by the Engineer.

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**SECTION 02114**  
**STOCKPILING, AMENDING, AND LOADING SOIL****3.03 STOCKPILE MANAGEMENT:**

- A. Impacted materials shall be placed only in properly constructed and maintained stockpiles. Do not place any designated non-impacted materials in the impacted material stockpiles.
- B. Prevent impacted soil dust from becoming airborne. Place and anchor stockpile covers at the completion of each workday and during periods of rain or wind. Cover the stockpiles whenever the stockpiles are not being used.
- C. Provide run-on controls to divert storm water away from stockpiles. Collect accumulated leachate from lined stockpile areas and manage the water as necessary for discharge to on-site treatment system as directed by Engineer.
- D. Contractor shall minimize vehicular traffic on the cover and liner.
- E. Stockpiles shall be managed to prevent the emission of dust, vapors, or odors.
- F. Stockpiles shall be managed to prevent soil erosion or sedimentation in accordance with Section 01570.

**3.04 STOCKPILE INSPECTION:**

- A. Engineer may inspect impacted material stockpiles to verify the integrity of the stockpile liner and cover system.
- B. All deficiencies noted by Engineer shall be immediately corrected to the satisfaction of Engineer. If necessary, stockpiled material shall be relocated to another impacted material stockpile so that repairs can be made.
- C. The Contractor shall inspect each stockpile daily for damage and immediately repair any deficiencies encountered.

**3.05 AMENDING:**

- A. In the course of the excavation, saturated material may be encountered, which may be deemed by the Engineer unsuitable for shipment for disposal. At the direction of the Engineer, Contractor shall amend this soil.
- B. The Contractor shall amend soil with soil additives containing less than 50% free Lime.

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**SECTION 02114**  
**STOCKPILING, AMENDING, AND LOADING SOIL**

- C. Contractor shall thoroughly mix soil additives to the saturated soil. If possible, this mixing should be performed within the excavation area where the saturated soil is encountered.
- D. Contractor may dispose of the amended soils off-site upon approval from the Engineer.

**3.06 LOADING:**

- A. The Contractor shall prepare and load all trucks and containers for transport and disposal of materials excavated from the Site as specified in the following paragraphs.
- B. Coordinate with the selected waste hauler to furnish all vehicles and containers required for transportation of materials from the Site as specified in Section 02120.
- C. Visually inspect and decontaminate the exterior of all vehicles and containers in compliance with all applicable regulations and Section 02130.
- D. Coordinate loading operations and hours with the operating hours of the disposal facilities identified in Section 02120.
- E. Load all trucks carefully to prevent spills. Stage trucks within the remediation area so that spills shall be contained within the area and easily removed. If required by Engineer, spread polyethylene sheeting over an area sufficient for truck loading.
- F. Contractor shall be solely responsible for proper loading of, and abiding by the load limits and weight limits for, all vehicles leaving the Site. All fines, taxes, penalties or judgments resulting from overweight or improperly loaded vehicles shall be the Contractor's responsibility.
- G. Track-mounted equipment shall undergo decontamination per Section 02130 prior to leaving the Exclusion Zone.
- H. Transportation shall be per Section 02120.
- I. Contractor shall be responsible for ensuring that all material loaded for off-site disposal meets paint filter criteria in accordance with all applicable transportation laws and regulations and the requirements of the receiving landfill.

**3.07 STOCKPILE REMOVAL:**

- A. After removal and relocation or disposal of stockpiled materials, the Contractor shall remove the geomembrane bottom liner and top cover from the stockpile area(s) and

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**SECTION 02114**  
**STOCKPILING, AMENDING, AND LOADING SOIL**

dispose at the designated off-site disposal facility with the impacted soil and debris at the completion of the Work.

**END OF SECTION**

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**SECTION 02120**  
**OFF-SITE TRANSPORTATION AND DISPOSAL****PART 1 – GENERAL****1.01 SECTION INCLUDES:**

- A. Summary
- B. Submittals
- C. Coordination with Waste Management Facilities
- D. Designated Haul Routes
- E. Shipping Documentation
- F. Waste Characterization
- G. Truck Bed Liners
- H. Preparation for Transport
- I. Transportation to Waste Management Facility
- J. Manifests
- K. Transportation
- L. Permits

**1.02 SUMMARY:**

- A. This Section includes transportation of excavated materials and debris to specified disposal facilities. Contractor is responsible for the cost of all material transportation and disposal. The Contractor shall only utilize routes designated in the Transportation of Solid and/or Liquid Materials Plan. It is the responsibility of the Contractor to utilize equipment and personnel capable of navigating the local traffic patterns while maintaining minimum daily production required in order to meet the project milestones. The Contractor shall be responsible for all delays caused as a result of trucks not following approved traffic routes, due to inadequate scheduling of trucks causing traffic delays, or from utilizing equipment that cannot safely navigate the local roadways.
- B. The Contractor shall provide tracking documentation for each load of excavated material moved. Each load shall have tracking documentation identifying the waste characterization data provided by the Engineer.
- C. Contractor shall be solely responsible for proper vehicles loading. The Contractor shall ensure the vehicle contents are properly contained and secured in the vehicle including proper lining and covering of loads. The Contractor shall abide by all load limits and weight limits for all vehicles leaving the Project Site, and is responsible for any fines, taxes, penalties, or judgments resulting from overweight or improperly loaded vehicles

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**SECTION 02120**  
**OFF-SITE TRANSPORTATION AND DISPOSAL**

- D. Contractor will employ dedicated flaggers to stop and direct all traffic at the location where trucks will exit from the site at all times during soil transportation activities and as needed along the trucking route.
- E. Trucks shall only enter and exit the site at locations shown on the Contractor's Traffic Plan unless approved by the Engineer.
- F. The requirements specified in the Engineer's Transportation of Solid and/or Liquid Materials Plan and the Contractor's Traffic Plan shall be implemented including, but not limited to:
  - 1. All truck drivers shall undergo an orientation detailing, at a minimum, the work requirements of the Transportation of Solid and/or Liquid Materials Plan and Traffic Plan, City of Norwich traffic rules and regulations, driver conduct, approved haul routes, approved staging areas, and prohibition to stage or park trucks within Chenango County except in pre-designated areas.
  - 2. All truck drivers shall be required to sign the orientation form.
  - 3. All truck drivers shall be provided with hard copies of the orientation package including the Transportation of Solid and/or Liquid Materials Plan and the Traffic Plan.
  - 4. A hand-out detailing the haul routes, speed limits, warnings, designated staging areas, etc, will be provided to each truck driver.
  - 5. All truck drivers will be required to follow incident reporting requirements detailed in the Traffic Plan.

**1.03 SUBMITTALS:**

- A. Contractor shall provide a list of proposed waste haulers for approval by Engineer. Contractor shall submit copies of all necessary permits and certifications of listed waste haulers to Engineer before commencing the Work.
- B. The Contractor shall submit written certification of proper transport of Impacted Materials to Engineer within one working day after receipt of the documentation. Contractor shall submit carbon copies (with all signatures affixed) of all waste manifests, weigh tickets, waste tracking logs and other shipping documentation.

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**SECTION 02120**  
**OFF-SITE TRANSPORTATION AND DISPOSAL**

- C. Daily Construction Report shall include detailed documentation of all loading and transport activities as specified in Specifications Section 01320 – Construction Progress Documentation.
- D. Contractor shall provide truck driver orientation signature sheets for all truck drivers.
- E. Contractor shall verbally inform the Engineer of any trucking related incident within an hour of the incident and provide any trucking related incident reporting forms to the Engineer within four hours of the incident.

**1.04 WASTE CHARACTERIZATION:**

- A. The Engineer, through coordination with the Contractor, shall be responsible for the collection and analysis of waste characterization samples associated with any soils excavated at the Site. The collected soil samples will be sent to a New York State accredited laboratory for analysis under standard turn-around-times.
- B. The Contractor shall be responsible for the characterization of any spoils associated with ISS activities.

**1.05 COORDINATION WITH WASTE MANAGEMENT FACILITIES:**

- A. The Contractor shall be solely responsible for coordinating waste shipments with the waste management facilities. The Contractor shall utilize one of the following pre-approved facilities for all soil disposal:
  - 1. Environmental Soil Management, Inc., located at 304 Tow Path Road, Fort Edward, NY, 12828.
  - 2. Seneca Meadows, Inc., located 1786 Salcman Road, Waterloo, NY, 13165.
- B. The Contractor shall prioritize shipping to the lowest cost facility first. Additional approved facilities will then be used based on availability and cost, should the lowest cost facility limit acceptance. The Engineer shall be notified on a daily basis of the anticipated shipping volume and the destination facility.

**1.06 DESIGNATED HAUL ROUTES:**

- A. Contractor shall follow the designated haul routes as outlined in the Transportation of Solid and/or Liquid Materials Plan. The intent is to minimize traffic impacts to residential areas.

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**SECTION 02120**  
**OFF-SITE TRANSPORTATION AND DISPOSAL****1.07 SHIPPING DOCUMENTATION:**

- A. Shipping documentation shall be performed consistent with federal, state, and local waste management and transportation requirements and the requirements of off-site disposal facilities.
- B. The Contractor shall prepare necessary paperwork for transportation and disposal of all materials to the appropriate waste management facilities.
- C. A non-hazardous/hazardous waste manifest or other tracking document shall be provided by the Contractor for each individual load depending on material classification. Each manifest shall be signed by an authorized agent of the Owner, the truck driver as a transporter, and by the disposal facility operator.
- D. The Contractor shall not be paid for shipments with unsigned shipping documentation.
- E. Daily Trucking Log:
  - 1. The Contractor shall provide a Daily Trucking Log to the Engineer for approval providing information on each off-site shipment from the site, including trucking company, truck and trailer registration number, date, pre-characterization source ID, destination facility, estimated quantity, verification of decontamination, and Contractor personnel's initials.
  - 2. The Contractor shall fill in the Daily Trucking Log for each shipment at the time it leaves the site.
  - 3. The Contractor shall submit the completed Daily Trucking Log to the Engineer electronically as specified in Specifications Section 01320 – Construction Progress Documentation and Section 01330 – Submittal Procedures.
  - 4. The Contractor shall not be paid for any shipment if there are discrepancies between Daily Trucking Logs and facility weigh tickets until the discrepancy is resolved, as determined by the Engineer.

**PART 2 – PRODUCTS****2.01 TRUCK BED LINERS:**

- A. Truck bed liners **for trucks transporting impacted soils** shall be 6-mil (minimum thickness) polyethylene sheets. Polyethylene sheets shall be of sufficient length and width

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**SECTION 02120**  
**OFF-SITE TRANSPORTATION AND DISPOSAL**

to cover the interior bed of the haul truck with no seams and have sufficient material to completely cover over the load with overlap.

**PART 3 – EXECUTION****3.01 PREPARATION FOR TRANSPORT:**

- A. Contractor shall coordinate transportation Work with excavation and stockpile management Work to maintain excavation production rates for completion of the Work in accordance with the Contractor's submitted work schedule and the Construction Milestones. Slowing or stopping of Work by Contractor due to lack of transportation, availability of trucks or shipping containers, or availability of disposal facility capacity does not release the Contractor for obligations to achieve the documented construction milestones.
- B. Trucks will not be allowed to stand on streets adjacent to the site awaiting entrance into the loading area.
- C. The Contractor is responsible for identifying an off-site truck staging area outside the City of Norwich as approved by the Engineer. The Contractor is responsible for coordinating, via radio or telephone, careful arrival of trucks to avoid congestion within the City Limits.
- D. No loading of soil shall take place in areas outside of the erosion and sediment controls.
- E. Tarps shall be placed over loads after liner has been overlapped. All loads shall be secured and tarped prior to exiting the Project Site. All trucks will have a watertight tailgate that has a gasket between the box and tailgate (or driver will apply caulking between the box and the tailgate) with secondary securing devices or "turnbuckles". Turnbuckles shall be in position to lock the tailgate before the truck leaves the site.
- F. Loading operations and hours shall be coordinated with the operating hours of the waste management facilities. Loading shall be limited to the hours of 8:00 a.m. to 5:00 p.m., Monday through Friday, or as otherwise specified or approved by the Engineer.

**3.02 TRANSPORTATION TO WASTE MANAGEMENT FACILITY:**

- A. Contractor shall furnish and operate all vehicles and containers for transportation of all waste materials and backfill soils to and from the Project Site.

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**OFF-SITE TRANSPORTATION AND DISPOSAL**

- B. Drivers hauling Impacted Material shall drive directly to disposal facility or approved staging area and shall not stop except in the event of an emergency.
- C. Transportation of all Impacted Material shall be in compliance with all pertinent Regulations.
- D. Contractor shall visually inspect each truck and fill out a Daily Trucking Log before the truck leaves the site to ensure that the tailgate and tarp are secure. Contractor shall decontaminate vehicles as specified in Section 02130 - Decontamination.
- E. Haul trucks shall be lined with polyethylene sheeting and/or decontaminated on site prior to re-use for hauling anything other than material from the site. Contractor shall provide appropriate staging so that workers can safely line the truck bed. Truck beds shall be included in the decontamination.
- F. Contractor's remedial workers will reposition the cover bars over the waste material.  
**DRIVERS WILL NOT WALK OVER WASTE MATERIAL.**
- G. In the event that a loaded truck is involved in an incident that results in a release of the transported materials, the cleanup shall follow local and State Department of Transportation spill response procedures.
- H. Contractor shall promptly clean up any spills on haul routes, if they occur, with suitable equipment at no cost to the Engineer or the Owner.
- I. Contractor shall keep all haul routes and public rights-of-way free of any Project Site materials due to the Contractor's operations. To this end, all Contractor trucks shall be covered to prevent any material from leaving the truck, and all vehicles shall be carefully loaded to prevent site materials from coming in contact with the exterior truck surfaces.
- J. The load weight shall be documented by the disposal facility scale Weigh Ticket. Contractor shall submit copies of all disposal facility scale Weigh Tickets to the Engineer. Unsigned scale Weigh Tickets will be rejected and the Contractor will not be paid based on these weights.
- K. Contractor shall prevent any tracking of Project Site materials onto public rights-of-way.
- L. Loaded trucks shall not leave the Site unless they shall arrive at the designated waste management facility before it closes. Loaded trucks shall discharge their loads at the designated waste management facility the same day they are loaded.

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**SECTION 02120****OFF-SITE TRANSPORTATION AND DISPOSAL**

- M. Truck drivers shall be required to remain inside the truck cab with the windows and doors closed during loading. Drivers shall be instructed to proceed after loading through a decontamination area to a designated area outside the exclusion zone where they will be permitted to exit the truck cab to inspect the load.
- N. The Contractor shall address vehicular accidents and the possible release of transported materials in their HASP and Traffic Plan.

**3.03 WASTE MANAGEMENT DOCUMENTATION:**

- A. Contractor will prepare manifests, and prepare necessary paperwork for transportation and disposal of impacted materials and debris.
- B. A non-hazardous/ hazardous waste manifest or other tracking document shall be provided by the Contractor for each individual load depending on material classification. Each manifest shall be signed by designated authorized agent of the Owner, the truck driver as a transporter, and by the disposal facility operator.
- C. The Contractor will not be paid for shipments with unsigned manifests.

**3.04 TRANSPORTATION:**

- A. Contractor shall obtain all required transportation permits for shipment of Impacted Materials and debris.
- B. Transportation of Impacted Materials and debris shall be in accordance with applicable State, RCRA, US DOT, local, and other applicable Regulations including, but not limited to, 40 CFR 261, 262, 263 and 49 CFR 171 through 179.
- C. Truck drivers using routes other than the routes allowed in the Transportation of Solid and/or Liquid Materials Plan or found upon investigation to be at fault of causing an accident associated with this Project shall be barred from working on the Project Site.
- D. Truck drivers not following the requirements detailed during the orientation, in the Transportation of Solid and/or Liquid Materials Plan, or in the Traffic Plan shall be barred from working on the Project Site.

**3.05 PERMITS:**

- A. Contractor shall obtain all required transportation permits for shipment of Impacted Materials and debris. Contractor shall maintain a current copy of all transportation permits for all approved waste haulers on-site in the Contractor's trailer.





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**SECTION 02120**  
**OFF-SITE TRANSPORTATION AND DISPOSAL**

**END OF SECTION**



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## **SECTION 02130 DECONTAMINATION**

### **PART 1 - GENERAL**

#### **1.01 SECTION INCLUDES:**

- A. Summary
- B. Submittals
- C. Decontamination Facilities
- D. Decontamination of Vehicles and Equipment
- E. Personnel Decontamination
- F. Truck and Equipment Decontamination Methods
- G. Management of Decontamination Residues

#### **1.02 SUMMARY:**

- A. This section covers the decontamination of personnel and equipment as they move from the Exclusion or Work Zones into the support Zones of the site.

#### **1.03 SUBMITTALS**

- A. Prior to mobilization, Contractor shall submit personnel decontamination procedures as part of the Contractor's HASP specified in Specifications Section 01415 – Health and Safety Requirements. Contractor shall provide the following information:
  - 1. Number and location of decontamination and wheel wash stations.
  - 2. Decontamination methods and equipment that will be used in accordance with NYSDEC requirements.
  - 3. Procedures to prevent contamination of clean areas including procedures for decontamination of all trucks and equipment.
  - 4. Methods and procedures to minimize worker contact with contaminants during removal of personal protective equipment (PPE).
  - 5. Procedures for inspection and decontamination of vehicles leaving the Site.
  - 6. Procedures for disposal of personal PPE.
  - 7. Procedures for the collection, and off-site treatment and disposal of all decontamination water and residuals.
  - 8. Procedures for minimizing generation of wastewater.

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## **SECTION 02130 DECONTAMINATION**

### **PART 2 - PRODUCTS**

Not Used.

### **PART 3 - EXECUTION**

#### **3.01 DECONTAMINATION FACILITIES**

- A. Construct and maintain decontamination facilities and wheel wash stations in accordance with these specifications or as otherwise proposed by Contractor and approved by the Engineer.

#### **3.02 DECONTAMINATION OF VEHICLES AND EQUIPMENT**

- A. Contractor shall inspect and decontaminate all vehicles and equipment that have entered the Exclusion Zones upon exiting the Exclusion Zone. All decontamination shall take place in the Decontamination Zone as specified in Specifications Section 01500 – Mobilization and Temporary Facilities.
- B. Decontamination shall include removal of soil and residues from the chassis (which includes undercarriage, suspension, and tire tracks) and other parts of the vehicle known to have been contaminated or visually appearing to be contaminated.
- C. Contractor shall take care while decontaminating vehicles to avoid contaminating personnel, other parts of the vehicle or equipment, or the surroundings. All personnel shall follow all applicable safety procedures described in Specifications Section 01415 – Health and Safety Requirements.
- D. Contractor shall decontaminate haul trucks after loading and before the haul trucks exit onto public streets. Contractor shall ensure that all haul trucks exit through the Decontamination Zone and receive proper decontamination and inspection.
- E. Contractor shall document decontamination of vehicles and equipment on the Daily Trucking Log as described in Specifications Section 02120 – Off-site Transportation and Disposal.

#### **3.03 PERSONNEL DECONTAMINATION**

- A. Contractor shall ensure that personnel who have entered the Exclusion Zone perform decontamination as required in the HASP as specified in Specifications Section 01415 – Health and Safety Requirements prior to exiting the Decontamination Zone.

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**SECTION 02130**  
**DECONTAMINATION****3.04 TRUCK AND HEAVY EQUIPMENT DECONTAMINATION METHODS:**

- A. Physical removal techniques used to decontaminate materials and wastes shall include, but are not limited to, brushing and spraying with heated-water pressure washer until all visible contamination and debris is removed.
- B. Brushing shall consist of removal of loose materials with the use of a broom and/or brushes.
- C. A heated water pressure washer shall be used to provide application of water of sufficient temperature, pressure, residence time, and agitation to remove soil and contaminated residuals from surfaces.
- D. Surfactants and detergents must be approved by the Engineer prior to use in decontamination operations.
- E. All equipment decontamination procedures shall be performed in a decontamination facility.
- F. Overspray barriers shall be provided on each side of the decontamination area to prevent re-contamination of adjacent areas.

**3.05 MANAGEMENT OF DECONTAMINATION RESIDUALS**

- A. Contractor shall collect and settle decontamination liquid to remove solids prior to transfer and treatment at the on-site water treatment system.
- B. Contractor shall dewater and collect decontamination solids. Dewatered decontamination solids shall be managed as Impacted Material, as specified in Specifications Section 02120 – Off-site Transportation and Disposal.

**END OF SECTION**

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**SECTION 02150**  
**ODOR AND VAPOR CONTROL****PART 1 – GENERAL****1.01 SECTION INCLUDES:**

- A. Summary
- B. Submittals
- C. Quality Control
- D. Air Handling Equipment
- E. Lighting
- F. Air Treatment System
- G. Odor Suppressing Foam
- H. Air Monitoring Equipment
- I. Operation and Maintenance
- J. Performance
- K. Monitoring

**1.02 SUMMARY:**

- A. The Contractor shall provide all materials, equipment, and labor to provide odor and vapor control at the site during but not limited to all excavation, demolition, ISS treatment, backfilling, stockpiling, loading of impacted soil, and MGP waste handling and transport.

**1.03 SUBMITTALS:**

- A. The Contractor shall provide in the Technical Execution Plan (TEP) detailed descriptions and drawings with the means and methods proposed for controlling and monitoring odors and vapors during the work.
- B. Contractor shall submit written documentation showing conformance of the materials and constructed work with the specifications.
- C. All odor and vapor control equipment and materials shall be approved by the Engineer prior to use.
- D. The Contractor may propose alternative means and methods for controlling dust, odors, and vapors from site operations, particularly for activities conducted during ISS treatment. Equipment or material substitutions for odor and vapor control will be evaluated by the Engineer prior to use on-site on a case-by-case basis. Alternative means and methods of controlling odors and vapors cannot be used until approval by the Engineer is received in writing.

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**SECTION 02150**  
**ODOR AND VAPOR CONTROL****1.04 QUALITY CONTROL:**

- A. Contractor shall monitor the air in the work zone in accordance with this specification and the site specific Health and Safety Plan to confirm that the levels established for odors and vapors are maintained.

**PART 2 – PRODUCTS**

- A. Contractor shall provide odor suppressant as specified in the Community Air Monitoring Program (CAMP).

**PART 3 – EXECUTION****3.01 OPERATION AND MAINTENANCE:**

- A. The Contractor shall be prepared to operate the odor neutralization system 24 hours per day, 7 days per week throughout the entire portion of the project and MGP impacted soils are exposed as directed by the Engineer.

**3.02 PERFORMANCE:**

- A. The Contractor shall monitor the workspace to ensure action levels specified in the Contractor's HASP are observed and that the proper level of personnel protective equipment is utilized.
- B. The Contractor shall apply odor-suppressing foam to the soil stockpiles, excavations, loading operations, or ISS treatment operation as directed by the Engineer.
- C. The Contractor shall provide labor, equipment, and material required to apply odor and vapor suppressant foam to all exposed soil areas including stockpiles within 5 minutes when directed by the Owner or the Engineer. No separate payment shall be made for supplying and operation of vapor/odor control equipment. Payment for vapor/odor suppression materials will be per the bid unit price. Failure to apply vapor/odor suppression materials within the specified time shall result in all Contractor operations being suspended until such time as the Engineer feels the request for controls has been fully satisfied by the Contractor and no additional payment for such downtime shall be due to the Contractor.
- D. The Contractor shall provide sufficient material to apply odor controls as directed during the entire period when soil disturbance occurs.
- E. Vapor suppression foam shall be utilized to cover stockpiles during stockpiling and loading of any soil containing tar like materials or NAPL.

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**SECTION 02150**  
**ODOR AND VAPOR CONTROL**

- F. All exposed areas and stockpiles left untouched for greater than 2 hours shall be covered with a secured polyethylene tarp. All stockpiles left overnight shall be similarly covered.
- G. The Contractor will be notified when real time community air monitoring being performed at the site perimeter indicates levels have reached of the action levels specified in the CAMP. Upon notification, the Contractor shall begin to implement odor/vapor reduction controls as necessary.

**3.03 MONITORING:**

- A. The Contractor shall monitor the air in the work zone to confirm that the safe work environment standards are met.

**END OF SECTION**

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**SECTION 02196**  
**IN SITU SOLIDIFICATION – AUGER MIXED****PART 1 – GENERAL****1.01 INCLUDED IN THIS SECTION**

- A. References
- B. Definitions
- C. Qualifications
- D. Submittals
- E. Grout Mix Design
- F. Performance Requirements
- G. Solidification Water
- H. Reagents
- I. Grout Preparation
- J. Coordination of Work
- K. Solidification
- L. Spoils Management
- M. Performance Monitoring
- N. Reprocessing – Treated Columns
- O. ISS Equipment Requirements

**1.02 SUMMARY:**

- A. Section Includes:
  - 1. *In Situ* Solidification of MGP impacted soil.
- B. Related Sections:
  - 2. Section 01150 – Health and Safety
  - 3. Section 01570 – Temporary Sediment and Erosion Control
  - 4. Section 02260 – Excavation
- C. The Contractor shall provide all designs, submittals, equipment, materials, and manpower to complete the In Situ Solidification (ISS) of impacted soil as specified in this section and as shown on the Drawings.
- D. An auger system specifically designed for environmental remediation shall be used. The auger system must be capable of in-situ treatment of target soils to full



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**SECTION 02196**  
**IN SITU SOLIDIFICATION – AUGER MIXED**

required depth with the appropriate sized auger. Treatment depths will range from 26 to 34 feet below ground surface. A crane-mounted (“Table-Top”) type ISS auger rig will not be required for this project.

- E. The ISS of impacted soils is a performance based contract item. The Contractor’s responsibility for soils targeted for ISS treatment includes excavation, material handling, amending/dewatering for disposal, stockpiling, erosion and odor control, loading, trucking, and disposal of the excess ISS spoil and/or soil. Appropriate measures to provide the designed Top Elevation for ISS Treatment shall be included in the Contractor’s price for ISS treatment of soils. The bottom elevation of ISS treatment for each column will be determined by the Contractor depending on the diameter of auger that will be utilized for ISS treatment of the site and the provided top of clay barrier layer surface.
- F. Prior to full scale treatment of impacted soils on the site the Contractor shall conduct a Field Demonstration of the proposed ISS mix design(s).

**1.03 REFERENCES:**

- G. American Society for Testing and Materials (ASTM)
  - 1. C 150: Standard Specification for Portland Cement.
  - 2. D 5084: Standard Test Methods for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter.
  - 3. D 1633: Standard Test Method for Compressive Strength of Molded Soil Cement Cylinders.
  - 4. ASTM C989-99 Standard Specification for Ground Granulated Blast-Furnace Slag for Use in Concrete and Mortars
- B. American Petroleum Institute (API):
  - 1. 13-A: Specification for Bentonite.
  - 2. 13 B-1: Viscosity and Density.

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**SECTION 02196**  
**IN SITU SOLIDIFICATION – AUGER MIXED****1.04 DEFINITIONS:**

A. The following definitions are used in this section:

1. Grout - The mixture of reagents and water that shall be injected into the impacted soil.
2. Grout Reagent –Type I Portland Cement, Bentonite, Ground Granulated Blast-Furnace Slag (GGBFS) Cement or other material approved by the Engineer for solidifying impacted soils.
3. Homogeneous Mixture – A uniform, unvarying, and consistent blend of impacted soil, grout, and liquids, free from NAPL blebs and free from pockets of unmixed materials and free liquids.
4. ISS Design Elevations:
  - a. Top Elevation for ISS Treatment – the elevation of the top of ISS treatment as shown on the Drawings.
  - b. Bottom Elevation for ISS Treatment – the elevation(s) of the bottom of ISS treatment as shown on the Drawings and as later confirmed by the Contractor based on top of clay barrier layer.
5. ISS Working Platform – the graded surface of stable soil on which the ISS mixing equipment shall operate.
6. Mixing Pass – operation of the mixing equipment from the top elevation for ISS treatment to the bottom elevation for ISS treatment and back to the top.
7. Obstruction – subsurface manmade or natural object that impedes auger advancement.
8. Overlap Ratio – the ratio between the overlap distance between adjacent ISS columns and the width of the ISS column.
9. Penetration Rate – The rate, in feet per minute, at which the mixing auger is advanced into the ISS column.

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10. Extraction Rate – The rate, in feet per minute, at which the mixing auger is retracted from the ISS column.
11. ISS Area – The portion of the Site, south of Front Street not part of the original MGP requiring ISS treatment of soils containing greater than 500 mg/Kg of PAHs contamination.
12. Limits of ISS Treatment – The outer or extreme horizontal edge of the ISS Area.
13. ISS Perimeter – The portion of the ISS Area extending from the Limits of ISS Treatment, as defined in the Drawings, at a minimum, 10 horizontal feet toward the center of the ISS Area. This is the portion of the ISS Area that requires installation to a depth of 4 feet below the surface of the clay barrier layer.
14. Pre-ISS Excavation – the removal of soil from the Existing Grade elevation to the Top Elevation for ISS Treatment as shown in the Drawings.
15. ISS Swell/Spoils Management Excavation – the removal of soils and/or ISS Spoil to ensure that the upper vertical limit of ISS elevation is the Top Elevation for ISS Treatment as shown in the Drawings..
16. ISS Auger Refusal – a condition that occurs during mixing when the auger can no longer be advanced either due to obstruction or soil geotechnical properties, defined as less than 6 inches of penetration over a 10-minute period. Contractor shall communicate Refusal conditions.
17. ISS Spoil/Swell – the excess material resulting from addition of reagent to the *in situ* soils, typically a mixture of soil and reagent that “returns” to the top of the column. ISS Swell and ISS Spoil are used interchangeably in this and other sections.
18. Mixing Energy – A measure of the mixing effort for each grout columns expressed as the number of mixing cycles (i.e., rotations) per unit length of ISS column.
19. Bottom of Column Elevation – The depth to which the ISS column was installed as measured to the lowest continuous surface on the auger head.

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- A. The Contractor or ISS Subcontractor shall have completed at least 3 ISS remediation projects of similar size and scope.
- B. The Contractor's or ISS Subcontractor's Project Manager/Superintendent shall have a minimum of 5 years of experience with ISS projects of similar scope, with a minimum of 2 of those years in the role of project Manager/Superintendent.
- C. The Contractor's other Key Personnel shall have a minimum of 2 years of experience with ISS projects of similar scope. Other Key Personnel include equipment operators, batch plant operator, ISS rig operator, supervisory engineering staff, and technical staff involved with the ISS system operation.
- D. Qualifications for Subcontractor and Subcontractor's Key Personnel shall be included in the Technical Execution Plan submitted in the Subcontractor's bid package.

**1.06 SUBMITTALS:**

- A. All submittals shall be completed and submitted in accordance with Section 01330 - Submittal Procedures.
- B. The Contractor shall submit a Technical Execution Plan (TEP) with their bid. At a minimum, the TEP shall include:
  - 1. Description and specifications of ISS system, equipment, and processes, including available torque and available down-force applied at auger tip.
  - 2. ISS Layout Drawing showing the configuration and layout of the ISS system. The layout of the Batch Plant (ISS System) on Drawing 5 is conceptual. The Contractor shall provide their own layout.
  - 3. Proposed auger size(s) and configuration.
  - 4. Site map showing the proposed layout and pattern, including overlap ratio between adjacent columns, of the individual ISS columns.
  - 5. Methods for determining and verifying the coordinates, elevations, verticality, and depths of the ISS columns.

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6. Tables showing installation depth, northing and easting, reference vertical and horizontal datum, effective and actual treatment volume, required reagent quantities and column diameter for each ISS treatment column.
7. Estimated production rate for solidification in terms of number of columns and cubic yards per day.
8. Proposed ISS reagents and design mix proportions.
9. Sample calculation for theoretical ISS column indicating required grout quantities.
10. Methods of controlling and mitigating exhaust, dust, and odor emissions and noise levels generated from the ISS and grout batch plant equipment.
11. Methods for transporting, storing, protecting, and handling reagents, including controls and mitigation for dust and noise.
12. Detailed description and procedures for preparing reagent batch mixes, including methods to prepare and measure reagents to verify and document proper reagent mix proportions.
13. Detailed descriptions and procedures for controlling, measuring, monitoring, and documenting the injection of ISS reagents into the ground during each mixing pass.
14. Detailed descriptions and procedures for monitoring and documenting mixing energy, including auger rotation speed, penetration rate, and extraction rate during each mixing pass to verify that proper mixing energy is provided along the full length of the ISS column and that the resulting ISS column will be homogeneous.
15. Detailed description of a field test (Demonstration Test) to demonstrate that the proposed equipment and methods can successfully construct ISS columns to the specified depths and can create a homogeneous mixture of soil and grout meeting specified performance criteria.
16. Total estimated quantity of water and solidification reagents required for the Work.

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17. Detailed solidification procedures and sequencing.
18. Equipment and methods for breaking existing ISS mass into sizes practical for in-situ re-solidification with vertical auger rig.
19. Proposed dewatering procedures.
20. Contact water management, treatment and disposal procedures.
21. Stormwater run-on controls, management and discharge procedures.
22. Detailed descriptions and procedures for Contractors approach to the ISS Swell/Spoils Management Excavation.
23. Estimated schedule for completion of the Work.
24. Wash out and grout disposal facilities and practices.
25. Procedures and materials for freeze protection of the grout pumping/ISS equipment to include flushing procedures to ensure “antifreeze agent” does not become mixed into grout and ISS treated soils.
26. Any proposed deviations from the Specifications and Drawings.
27. Spill control measures.
28. Erosion control measures.
29. Quality Control sampling methods, standard operating procedures, personnel, and equipment.
30. Resumes for key personnel assigned to conduct the Work, including Project Superintendent, ISS rig operator, other equipment operators, reagent plant operators, supervisory engineering staff, and other technical staff.
31. Equipment manufacturer’s specifications and description.
32. Method to manage/remove subsurface obstructions encountered during the ISS process.

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- C. Contractor shall identify in the TEP and maintain sufficient redundant or backup equipment/spare parts to minimize delays attributable to equipment failures. The Contractor shall include a failure modes and effects analysis and determine systems or components that are likely to fail or require routine maintenance in the course of normal operation for this project. This analysis should determine credible failure modes or maintenance activities, which, if occurred, would result in the inability to measure parameters critical to the performance of the work, or result in significant delays in the work.
- D. Contractor shall provide (electronically, on a form acceptable to Engineer) a daily ISS report summarizing daily ISS activities including daily totals and running totals for volume of soil mixed and reagents used. Contractor shall attach daily grout mixing forms as required by Section 3. ISS daily reports shall be submitted daily no later than 10:00 am the following day and shall include at a minimum the following information:
1. Date and Project Identification.
  2. ISS equipment used; auger size(s)
  3. Equipment problems/failures/maintenance that affected ISS efforts
  4. List of columns solidified. Running total of number of columns solidified.
  5. Volume of soil solidified that day and as a running total.
  6. ISS Column Log for each column solidified. Logs shall include:
    - a. Column Identification.
    - b. Date that work was performed.
    - c. Design and actual bottom elevation of ISS column.
    - d. Estimated depth of toe-in into clay barrier layer
    - e. Column (neat) volume (cy).
    - f. Volume of grout injected into the column (gallons)
    - g. Calculation of grout reagents used, including solids (lbs) and water (gallons).
    - h. Start and finish time.

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- i. Number of mixing passes. Mixing energy
  - j. Auger rotation speed during penetration and extraction.
  - k. Auger diameter. Number of mixing blades.
  - l. Any unforeseen Site conditions or equipment problems that affected solidification efforts.
  - m. Any modifications or deviations from the Specifications and Drawings or the Technical Execution Plan.
  - n. Any unforeseen Site conditions or equipment problems that affected solidification efforts.
  - o. Obstructions encountered. Notes on the appearance of the mixed material.
  - p. Depth, location, type, and number of quality assurance/quality control (QA/QC) samples collected.
- 7. Quantities of grout reagents received and offloaded including total weight received versus stored.
  - 8. A Site drawing highlighting the ISS columns completed to date.
  - 9. A survey data summary including Northing(s), Easting(s) and as-built top and bottom elevations provided for each column completed. This will include rendered CADD “surface” files as well as point files (in a format acceptable to Engineer) for the installed columns.
  - 10. Any modifications to project schedule.
  - 11. Spoils handling/management and quantities disposed offsite.
  - 12. Any unforeseen project or site conditions that affected solidification efforts.
  - 13. Any modifications or deviations from the Contract Documents or the Technical Execution Plan.
- E. Contractor shall provide a Final ISS Job Summary containing, at a minimum, the following information:



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1. Quantities of grout reagents delivered to the site and used during the project with backup in the form of certified weigh receipts, bills of lading, flow meter records, or equivalent.
  2. Any modifications to the project execution plan.
  3. Spoil disposal/handling methods and quantities managed and disposed offsite.
  4. Any unforeseen Site conditions or equipment problems that affected solidification efforts.
  5. Any modifications to or deviations from the Contract Documents.
  6. As-built survey drawings of the lateral extent and top and bottom elevations of the ISS columns and all QA/QC sampling locations. Identify any columns re-solidified during construction. Show locations and identification of all ISS columns on a plan. Provide generated CADD “surfaces” for top and bottom of ISS monolith.
  7. Results of all QA/QC test data.
- F. Contractor shall submit a Mix Design in accordance with the requirements of this specification.

**1.07 MIX DESIGN:**

- A. The Contractor shall provide a mix design that specifies the proportions and quantities of reagents and water.
1. The Engineer has conducted a treatability study with impacted site soils using varying percentages of Type I Portland Cement, Cement Kiln Dust, and Bentonite as reagents. The results of the treatability study are attached (Kemron, November 2009). The treatability study results are provided for information purposes only.
  2. The Treatability Study indicates that the soils at this site can be successfully solidified to meet specified performance criteria using varying combinations of Portland Cement, CKD, and Bentonite.

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3. The onsite mix design used during the original site work included 8% Portland Cement and 0.75% Bentonite at a water to dry reagent ratio of 1.23:1.
  4. The Contractor shall determine the appropriate mix design using the available Treatability Study and QA/QC data as guides. The Contractor shall be responsible for the effectiveness of the solidified soils as per the ROD and AROD. All treated soils that do not meet the performance criteria of Hydraulic Conductivity and Unconfined Compressive Strength shall be retreated at no additional cost to NYSEG.
  5. The Contractor may, at their option and own expense, perform additional bench studies to establish the design mix. The Contractor may also propose alternative solidification reagents not considered in the Engineer's Treatability Study, subject to approval by NYSEG. NYSEG can provide representative soil samples for treatability testing.
  6. The Contractor shall bear all costs associated with changes in the mix design and/or construction means and methods needed to achieve the performance criteria, including, but not limited to, sample collection and bench testing.
- B. The water to dry reagent ratio shall be kept as low as practicable so as to minimize generation of ISS spoils.
- C. Contractor shall calculate (on a form acceptable to the Engineer) the minimum reagent proportions as follows:
1. Calculate the volume of soil being treated based on the total depth of the impacted soil.
  2. Calculate the weight of soil being treated based on the previously calculated volume, using an appropriate unit weight for the soil being solidified.
  3. Water and reagent addition shall be in accordance with the mix design.

**1.08 PERFORMANCE CRITERIA:**

- A. The solidified soil shall have permeability less than or equal to  $1 \times 10^{-6}$  cm/s as determined by ASTM D 5084 Standard Test Methods for Measurement of

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Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter, latest edition. This criterion represents an upper bound value, and all performance test results shall meet this criterion without exception.

- B. The solidified soil shall have an Unconfined Compressive Strength (UCS) greater than 50 psi but less than 500 psi after 28 days as determined by ASTM D 1633 Standard Test Method for Compressive Strength of Molded Soil Cement Cylinders, latest edition. The 50 psi criterion represents a lower bound value, and all performance test UCS strength test results shall meet or exceed 50 psi without exception.
- C. The solidified soil shall have no free liquid present, as observed along the break surface of the USC test specimens.
- D. The Contractor shall, under the Engineer's direction, retrieve samples of mixed soil within one hour of mixing. The Engineer will produce and test Quality Assurance (QA) cylinders to confirm that the performance criteria are met.
- E. Passes or columns shall be laid out in a manner to solidify the entire area and provide an overlap between adjacent columns so that no soil within the specified horizontal and vertical limits of solidification is left untreated.
- F. The pre-excavation elevations and the Top Elevation for ISS Treatment are shown on the Drawings. However each column must be installed to required installation depth of 2 feet (4 feet for perimeter columns) into the clay barrier layer over the entire footprint of the column (i.e., the column shall penetrate the required distance into the clay at the edge of the column where the top of clay is deepest). Contractor shall not deviate from the elevations shown by greater than 0.5 feet without written authorization by the Engineer.
- G. Contractor shall ensure that the reagents are injected and mixed uniformly throughout the pass or column and that adequate and consistent mixing energy is applied to result in a uniform and homogeneous mixture, meeting the performance requirements listed in this section.
- H. Samples will be visually inspected by the Engineer to verify that a homogeneous mixture has been created, based on the following criteria:
  - 1. No visible non-aqueous phase liquids (NAPL) or sheen.

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2. Reagent and soil are thoroughly intermixed in the column, with uniform and consistent color, soil gradation, moisture content, and consistency.
  3. There are no unmixed soil clumps greater than 3 inches in maximum dimension.
  4. There are no portions of the column that have less than 15% passing the ½ inch sieve by volume. Cobbles and stone shall be removed by the Contractor as required to verify that sufficient slurry-soil mix is present to achieve the performance criteria.
  5. Columns that do not meet these criteria shall be immediately addressed by the Contractor.
- I. In compliance with direction from NYSDEC, following ISS mixing of impacted soils visual verification of proper solidification shall take place via core drilling of treated soils. Visual verification of proper solidification shall be by collection of core samples of ISS treated soils after no less than 7 days of curing time.
1. Core sample collection shall be via HQ wire-line core barrel, or similar method, with diamond drill bit. Cores will be collected at a maximum interval of five feet. If less than 60% of the core material is recovered from any of the 5 foot coring runs, one new core must be drilled adjacent to the previous location. If the recovery from the adjacent bore hole continues to be less than 60%, the location may be abandoned.
  2. Contractor shall provide support to the Engineer to facilitate the collection of these samples as directed by the Engineer.
  3. Coring implementation shall be as follows:
    - a. One core corehole shall be completed for every 5,000 square feet of ISS Treatment area, but not less than two core holes per treatment area.
    - b. To allow for adequate curing of the ISS material, the coring shall be conducted no earlier than seven days after the application of ISS.

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- c. To allow early coring information to be incorporated in adjusting ISS operations, the first coring location shall be completed when the ISS treatment project is no more than 25 percent complete.
  - d. Core boreholes shall be biased towards areas with the greatest soil contamination, areas where contamination is in direct contact with bedrock surface, and/or locations where difficulties in the ISS process were encountered.
  - e. Core boreholes shall be placed in locations where individual treatment columns or cells overlap, to the extent possible.
  - f. Cores shall be archived following coring activities, and may be discarded upon approval of the Final Engineering report.
4. Performance Evaluations – Core Samples and related equipment will be visually inspected for the following criteria, and the results recorded:
- a. Visible NAPL in core.
  - b. Non-mechanical induced cracking.
  - c. Percent recovery.
  - d. NAPL coating on drilling tools.
  - e. NAPL in drill wash tub.
5. Failure Determination – ISS installation will be considered a potential failure when one or more of the following conditions occur:
- a. A continuous layer or seam of NAPL is noted with the core.
  - b. An isolated ball of NAPL greater than one centimeter is identified within the core.
  - c. NAPL coating is visible on drilling tools.
  - d. Visible NAPL is noted in the drill wash tub.
6. Corrective Actions – If the ISS installation is deemed unsatisfactory after collaborative evaluation of the coring program, measures will be put in-place to address the deficiencies and ensure that the remedy is protective of human health and the environment. Such measures may include:
- a. Additional coring of the concerned area for further evaluation.

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- b. Repair, remixing, or isolation of the concerned area using jet grouting or other suitable method.
  - c. Excavation and disposal of the concerned area.
- 7. Core Abandonment – When a core has been drilled from the top to the bottom elevation of the targeted ISS treatment zone, and samples collected, it will be considered complete. Following completion of each coring location, the borings will be filled with grout.
- J. Contractor shall minimize the amount of spoils generated by the ISS processes, while still meeting the performance standard.

**1.09 ISS EQUIPMENT:**

- A. The ISS equipment shall be of sufficient size and capacity to solidify the soil to the depths indicated on the Drawings within the proposed ISS schedule and meeting the requirements of this specification. The Contractor shall provide an excavator capable of reaching to the total depth of solidification for obstruction removal during ISS activities. The excavator shall be available at all times during the ISS process. The equipment used shall be specified in the TEP.
- B. The grout mixing system shall be capable of precisely proportioning the mix reagents and thoroughly blending and mixing them into a homogeneous grout of uniform consistency. It shall be capable of continuously batching and mixing the grout in sufficient quantity without interruption due to inadequate batching, mechanical limitations, or volume limitations. Where used, automatic metering systems shall be calibrated in the presence of the Engineer prior to the beginning of grout injection and any additional times required by the Engineer. All automatic metering systems shall also have a manual backup method for verifying quantities. Properly calibrated volumetric containers and scales necessary for proper calibration of the mixing equipment shall be provided by the Contractor. Batch type mixers may be used, subject to provisions of an accurate means of proportioning the individual grout constituents, and shall be able to allow for uninterrupted injection. Batch plants which require slowing or stopping of the injection procedure while mixing additional batches are not acceptable.
- C. The ISS contractor shall be prepared to mobilize alternative/additional ISS equipment, if necessary, to complete the ISS work as indicated and specified at no additional cost to NYSEG.

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**IN SITU SOLIDIFICATION – AUGER MIXED****PART 2 – MATERIALS****2.01 SOLIDIFICATION WATER**

- A. Water shall be obtained from the City of Norwich via a water service connection, on or near the Site. The water service shall be equipped with a backflow preventer. Contractor shall obtain all permits and arrange for temporary hook up of water service and pay all fees for village water usage.
- B. Contractor shall not use any other source of water for solidification without written approval from Engineer.
- C. Contractor shall provide a means of measuring water for batch mixing. The measuring devices shall measure totalized and instantaneous flows. Measuring Devices shall be calibrated to within +/- 2% to accurately measure the water for each batch. Contractor shall provide documentation for the calibration. Measuring devices shall be recalibrated per the manufacturer's recommendations and, at a minimum, monthly during the work.
- D. Contractor shall provide and maintain all pipes and hoses used to connect the grout mixing plant to the City of Norwich water supply system.
- E. If water for ISS is stored on the site, storage containers shall be free of any waste materials, debris, and other items that may be deleterious to the execution of the solidification processes.

**2.02 GROUT REAGENTS:**

- A. The Contractor will provide Type I Portland Cement, bentonite, GGBFS, or other solidifying reagent only as approved by the Engineer for the solidification work.
- B. The Contractor shall control all dust during offloading, storage, transportation, mixing, and use of reagents.
- C. Reagents:
  - 1. Portland Cement – Type I Portland Cement Meeting the requirements of ASTM C150.

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2. Bentonite - Powdered bentonite meeting the requirements of API 13-A, Section 9 with a yield of 90 barrels of centipoise slurry per ton.
  3. Ground Granulated Blast-Furnace Slag (GGBFS) Cement – Grade 100 GGBFS, meeting the requirements of ASTM C989, at a minimum.
- D. Contractor shall coordinate the delivery of all reagents to the site.
- E. Contractor shall maintain strict dust control when offloading and handling dry bulk materials and shall meet all particulate control limitations set forth in the perimeter air monitoring plan.
- F. Contractor shall, at all times, maintain an adequate quantity of solidification grout materials so that the work is completed without delay. Any delays or costs associated with inadequate supply of grout materials at the Site shall be the responsibility of the Contractor.
- G. Containers and locations for materials storage shall be protected from precipitation, moisture, and other potential deleterious events.
- H. Containers for reagent storage shall be properly labeled per the supplier's requirements and Contractor shall maintain material safety data sheets for the reagents onsite at all times.
- I. The Contractor shall provide measuring equipment that is capable of measuring reagent quantities within a tolerance of +/- 2% by weight.
- J. Grout additives such as thinners, retarders, accelerators, etc. shall not be used without prior written approval from the Engineer.

**PART 3 – EXECUTION****3.01 GROUT PREPARATION:**

- A. Contractor shall complete a form to calculate the needed quantities of grout and grout reagents for each column. Calculated and actual quantities shall be provided including:
1. Column Identification



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2. Grout Unit Weight (lbs/cubic foot)(mud balance)
  3. Volume and weight of water added (Gal.)(lbs)
  4. Weight of Grout reagents (lbs)
- B. Contractor shall add the calculated quantities of reagent, as determined by the Contractor's mix design.
- C. Contractor shall thoroughly mix the water and reagent mixture until it is a consistent and homogenous grout mixture.
- D. Contractor shall pump or deliver the reagent mixture from the mixing plant to the ISS equipment at an adequate pressure and flow rate for the solidification process.
- E. Contractor shall verify that the grout volume and density meets the Performance Standards in this Specification. Grout shall be metered with a calibrated turbine flow meter properly sized for surrounding piping, or equivalent, modified for grout flow, that has the ability to display or record rate (gpm) and total (gal) injected into each column.
- F. Processed grout that reaches a temperature of more than 80°F or is held for greater than 1 hour prior to use shall be discarded at the Contractor's expense.
- G. The Engineer will periodically visually inspect each batch of mixed grout to ensure that the grout has been sufficiently mixed. Contractor shall continue to mix the grout until it is thoroughly mixed to the satisfaction of the Engineer.

**3.02 COORDINATION OF WORK:**

- A. Contractor shall coordinate ISS activities with excavation, dewatering, sampling, backfilling, and other Work as necessary.
- B. Contractor shall not backfill or cover any Work areas without prior approval from the Engineer.
- C. Protect structures, underground utilities, and other construction from damage caused by ISS operations.

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- D. Provide surveyed elevation bench marks on structures where required by the Engineer before commencing work when structures are within 100 ft of ISS operations. The Engineer will provide settlement monitoring during any work performed within 100 ft of ISS operation. Record and report elevation of each bench mark after ISS treatment. Should settlement monitoring readings indicate displacement, halt ISS treatment operations until corrective action has been provided and is acceptable to the Engineer.
- E. Provide crack gauges on structures where required by the Engineer before commencing work when structures are within 100 ft of ISS treatment operations. Record and report crack gauge measurements after installing ISS columns, and at least twice daily while ISS treatment is in progress. Should crack gauge readings indicate displacement, halt ISS treatment operations until corrective action has been provided and is acceptable to the Engineer.

**3.03 FIELD DEMONSTRATION**

- A. Prior to full scale operations, a Field Demonstration shall be conducted by the Contractor in accordance with the accepted TEP.
- B. At least two grout columns, for each proposed grout mix, shall be constructed to the specified depth using the grout mix proposed by the Contractor in the TEP. Field Demonstration columns shall be internal columns.
- C. At least 3 samples of treated soil shall be obtained from each ISS column for laboratory QA testing, one near the top of column, one near the middle and one near the bottom. Samples will be analyzed separately for UCS, hydraulic conductivity (K), and presence of free liquids. Samples will also be visually inspected for homogeneity. Full scale ISS treatment shall not begin until performance testing results (i.e. 7-day, early strength) show that the proposed mix(es) will meet the performance requirements.
- D. Expose the ISS column down to at least the water table. Measure column geometry and visually inspect for homogeneity.
- E. Obtain continuous core sample, after a minimum of 7 days of curing time, from the center and mid-radius point of one ISS column, from each proposed mix using sonic core drilling techniques or other methods approved by the Engineer.

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**IN SITU SOLIDIFICATION – AUGER MIXED****3.04 SOLIDIFICATION:**

- A. Contractor shall provide all personnel, equipment, and materials required to conduct the Work identified on the drawings and in these specifications.
- B. Solidification shall be conducted to the vertical and horizontal extents shown in the drawings.
- C. Prior to beginning solidification in a given area, Contractor shall excavate that area, at a minimum, to the Top Elevation for ISS Treatment. Should the Contractor elect to excavate additional soil below the Top Elevation for ISS Treatment the Contractor shall adjust grout injection volumes accordingly for the required treatment volume.
- D. In the event ground water is encountered during Top of ISS Monolith Pre-Cut, the Engineer may direct the Contractor to modify the Pre-Cut and Top Elevation of ISS Treatment for perimeter columns. In this manner the Contractor shall create a groundwater cut-off such that the interior column ISS area may be excavated below the water table. Contractor shall adjust grout mix requirements accordingly based on the actual Top Elevation of ISS Treatment.
- E. The Contractor shall perform surveying to document and confirm the Top Elevation for ISS Treatment. Contractor is responsible for maintaining the Top Elevation for ISS Treatment as shown on the Drawings unless otherwise directed by the Engineer.
- F. The Contractor shall note any variance for Top Elevation for ISS Treatment and adjust grout mix accordingly.
- G. In the event that the auger tool meets an obstruction, the Contractor shall notify the Engineer who will evaluate the following potential actions to be taken:
  - 1. Engineer may direct Contractor to excavate in an attempt to remove the Obstruction.
  - 2. The Contractor may choose to treat the remainder of the column depth with alternative measures, i.e. – jet grouting, at no additional charge to NYSEG.

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3. The Obstruction may be deemed unmovable (refusal) and no further action is required. The column is complete at that depth.
  4. The Engineer alone will make the determination when Refusal is reached and whether ISS column is considered complete.
- H. All ISS columns shall extend through the granular overburden and toe into the underlying clay barrier layer. The top of the clay barrier layer is defined in the Drawings and is based on available subsurface data. Columns shall be keyed approximately 4 feet into the clay barrier layer at the perimeter of the ISS monolith and approximately 2 feet into the clay barrier layer in interior portions of the monolith as indicated on the Drawings. The continuous perimeter key shall be installed at a minimum width of 10 feet as shown on the Drawings.
- I. Remnant foundations and other subsurface obstructions should be anticipated at this site. All obstructions shall be removed by the Contractor as necessary to facilitate ISS operations.
- J. The Engineer shall be notified immediately if an unanticipated obstruction is encountered.
- K. Dewatering shall be conducted to the extent necessary to complete the Work and to minimize effects of saturation of the treated soils. No more than two (2) inches of water will be allowed to pool on top of soils that have been mixed with grout in the previous week (7 calendar days). Contractor shall not handle mixed soils or ISS spoils that have more than 2 inches of water pooled on top of them except to grade for drainage.
- L. Grout addition shall be at the prescribed proportions of the mix design in accordance with the Contractor's TEP and as calculated on the Contractor's forms.
- M. Contractor shall mix grout with impacted soil until it is a homogeneous mixture of soil and grout from the Top Elevation for ISS Treatment to the required penetration into the clay barrier layer as shown on the Drawings.
- N. Auger shall be surfaced periodically to remove soil clods from the top of the auger for reprocessing within the column to ensure a homogenous mixture is achieved. Clumped or packed soils removed from the ISS auger shall not be deposited into completed uncured columns.

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- O. Contractor shall complete a minimum of three mixing passes of the entire column once bottom elevation of ISS treatment is reached for each column.

**3.05 SPOIL MANAGEMENT:**

- A. The Contractor shall remove or re-grade spoil as necessary to avoid exceedance of the design Top Elevation for ISS Treatment.
1. The Contractor shall manage spoils so that they do not accumulate in the working area and above columns yet to be mixed. The Contractor shall prevent spoil from previously mixed columns from being incorporated into subsequently mixed columns.
  2. The Contractor shall place excavated spoils in a temporary stockpile onsite for removal and disposal.
  3. Should the Contractor excavate below the Top Elevation for ISS Treatment disturbed cured ISS treated soils may not be used to restore the top of the monolith to the Top Elevation for ISS Treatment unless the disturbed treated soils are re-solidified.

**3.06 QUALITY ASSURANCE AND QUALITY CONTROL:**

- A. The Contractor shall collect a sample of the mixed grout for density verification testing according to API Method RP 13-B1 at a frequency of every third batch mixed or at the direction of the Engineer.
- B. ISS Column sampling:
1. Sampling Timing. Sampling of the treated soil will occur within 1 hour of mixing while it is still wet and pliable.
  2. Sampling Tool. Contractor shall collect samples as directed by the Engineer using a sampling tool capable of taking discrete samples from mixed material. Sampler shall be a hydraulically or similarly powered sampler capable of being fully opened and closed from the ground level. Sampler must be capable of retrieving a discrete sample from the Bottom of ISS elevations.

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**SECTION 02196**  
**IN SITU SOLIDIFICATION – AUGER MIXED**

3. The Engineer may instruct the Contractor to collect samples using the on-site excavator periodically in lieu of using the Sampling Tool. The collection method will be at the sole discretion of the Engineer.
4. Quality Control Testing: The Engineer will test QA samples at their discretion. Samples will be analyzed for UCS, hydraulic conductivity (K), and presence of free liquids. Samples will also be visually inspected for homogeneity.
  - a. At a minimum, one bulk sample of newly solidified soil shall be tested for every 250 cubic yards of ISS for the first 1,000 cubic yards of treated soil and one sample per every 500 cubic yards of ISS or one per day thereafter, whichever is greater.
- C. Contractor's sampling equipment must be maintained in close proximity to the area being actively solidified. Sampling equipment must be kept in good repair and Contractor shall maintain backup or redundant sampler and power supply on site for the duration of the project. Contractor shall be able to initiate sampling activities within 20 minutes of request by the Engineer.
- D. The Engineer will determine whether the Contractor's ISS operations meet specified Performance Standards.
- E. The center point of each column shall be located by the Contractor using survey equipment approved by the Engineer. Utilization of measuring tapes, cables, or triangulation for location of column center points will not be acceptable. The tolerance shall be plus or minus 1/4 the column overlap.
- F. Vertical depth of each column shall be recorded by comparing auger depth with a fixed reference elevation that shall not be changed throughout the project without prior approval of the Engineer. Monitoring and data collection systems such as Gamperl & Hatlapa® GmbH or equivalent are also acceptable where calibrated for specific rig and kelly bar assembly.
- G. ISS columns shall be keyed into the clay layer to the depths required by this specification. The top of clay elevations indicated on the Drawings are based on the available information. Bottom Elevation for ISS Treatment shall be provided by the Contractor in their TEP. These elevations will be approved prior to beginning the Work by the Engineer.

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**SECTION 02196**  
**IN SITU SOLIDIFICATION – AUGER MIXED**

- H. The Engineer may require additional sampling based on the QC and QA test results.

**3.07 REPROCESSING – TREATED COLUMNS:**

- A. The Contractor shall reprocess at Contractor's expense the column(s) at the direction of the Engineer if the QC or QA samples do not meet the requirements of the performance standards.
- B. If the sample fails the visual inspection by the Engineer's representative due to insufficient mixing, the Contractor shall reprocess the column from which such sample was collected. Reprocessing shall be completed immediately at the Contractor's expense.
- C. If the sample does not meet the requirements for the unconfined compressive strength, or permeability, Contractor shall at Contractor's expense reprocess the column(s) at the direction of the Engineer.
- D. If the sample fails the visual inspection for slurry-soil mix composition by the Engineer's representative due to cobble and rock content, the Contractor shall remove cobbles and rock from the column to bring the column composition within design requirements.

**3.08 RESTORATION**

- A. Following completion of ISS treatment of soils the Contractor shall remove all ISS treated soils and ISS spoil above the Top Elevation for ISS Treatment as provided in the drawings.
- B. The Top Elevation for ISS Treatment shall be created and "fine graded"

**END OF SECTION**

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**SECTION 02240**  
**DEWATERING****PART 1 - GENERAL****1.01 SECTION INCLUDES:**

- A. Summary
- B. Submittals
- C. Dewatering Equipment
- D. Dewatering-General
- E. Quality Control
- F. Sampling and Analysis

**1.02 SUMMARY**

- A. This Specification covers Work required to control and collect surface water, stormwater, and groundwater in disturbed areas and from excavated soil. The goal of the dewatering activities in the excavation area is to dewater the excavation, or to maintain a workable dry excavation and ISS work area. The collected water shall be disposed of offsite by the Contractor as part of this Project.

**1.03 PROJECT CONDITIONS**

- A. The Contractor shall be required to design, furnish, install, operate and remove a dewatering system to allow excavation to the depths shown on the Drawings. The system should be designed to keep groundwater levels at least 1 foot below active excavation activities, but should be designed to minimize the amount of water requiring off-site disposal. This system is intended to be basic in design and can utilize sumps and trenches.
- B. The water to be controlled is groundwater and surface water generated by dewatering of the active excavation and ISS areas. The water from the active excavation area or water in contact with exposed impacted soils may contain MGP residuals. This water will be segregated and pumped to on-site storage vessels (i.e. fractionation tanks) prior to shipment to a NYSEG-approved off-site treatment facility.

**1.04 SUBMITTALS**

- A. Contractor shall submit information in the Dewatering section of the TEP that details the principle components of the system and should contain narratives dealing with the installation, operation and maintenance and removal of the dewatering system. The TEP should detail excavation, backfill, and dewatering sequence that achieves the required level of dewatering. The design should contain drawings of the proposed dewatering

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**SECTION 02240**  
**DEWATERING**

system. The design should include a monitoring program so as to demonstrate compliance with these specifications.

- B.** The Contractor is to visit the site, be aware of its restrictions, and review the sub-surface and geotechnical information. The Contractor shall submit a detailed dewatering design to the Owner as part of the TEP.
- C.** Provide weekly Dewatering Logs summarizing the following information, at a minimum:
  - 1.** Quantity of groundwater and surface water pumped to the storage vessels during the week, in gallons with totalizing flow meters.
  - 2.** Condition of the dewatering system.
  - 3.** Weekly rainfall measured at the Site.
  - 4.** Weekly record of water levels within each excavation area.

**1.05 SEQUENCING AND SCHEDULING**

- A.** Dewater in conjunction with water treatment, excavation, and restoration as needed to reduce impacts to project schedule.
- B.** Coordinate and schedule the dewatering work in a manner that minimizes the quantity of water pumped while not affecting the excavation and restoration schedule.

**1.06 QUALITY CONTROL**

- A.** Establish, maintain, and document quality control, in a form acceptable to the Engineer, for all groundwater and surface water control systems, including monitoring equipment. Quality control documentation by the Contractor is required to assure compliance with regulatory requirements. Detailed records of quality control shall be kept by the Contractor for all dewatering operations.
- B.** Dewatering performance shall meet the following requirements:
  - 1.** Dewatering area shall be minimized to the extent necessary to conduct the excavation and backfilling work.
  - 2.** Dewater excavations to the extent practical to remove soils and pass the paint filter test and complete backfilling and compaction.

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**SECTION 02240**  
**DEWATERING**

3. All tar, oils, or other by-product like material shall be pumped and temporarily stored in on-site tanks. The material should be solidified, managed, and properly disposed.

**PART 2 – PRODUCTS****2.01 DEWATERING EQUIPMENT**

- A. The Contractor shall furnish, install and operate pumping equipment of sufficient capacities to meet the requirements for the removal of groundwater and surface water from work areas as necessary to complete the excavation and backfilling work.
- B. Contractor shall keep on hand, or have immediate access to, additional pumps of sufficient capacity to maintain dewatering activities during any pump breakdown, maintenance, or in case of flooding.
- C. Contractor shall provide sufficient suction and discharge hose or piping for transferring pumped liquids without causing erosion, sedimentation, or other adverse consequences.
- D. Contractor shall provide freeze protection for all dewatering hoses, piping, and pumping equipment necessary to execute the work throughout the winter months, including but not limited to: insulation, heat wraps, heaters, and/ or enclosures. Freeze protection chemicals or solutions shall not be used on site without prior approval of the Engineer.
- E. Equipment for dewatering may be new or used, but shall be suitable for the Work and be maintained in good condition.
- F. Contractor shall repair or replace damaged pumps, piping, hoses, tanks, and all other dewatering equipment and materials within four working hours if damaged. Damage includes any pump and power failures, leaks, breaks, clogs or other conditions that adversely affect the dewatering system or release contaminated water.
- G. Contractor shall keep on hand at least 30,000 gallons of construction water storage.
- H. Contractor shall keep on hand, or have immediate access to, spare components to provide reasonably for any breakdown. Contractor shall maintain on site spare dewatering pumps during the dewatering work.
- I. All dewatering equipment shall remain the property of Contractor and shall be decontaminated in accordance with Specifications Section 02130 – Decontamination and removed from the Project site at the completion of the Work.

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**SECTION 02240**  
**DEWATERING****PART 3 - EXECUTION****3.01 DEWATERING-GENERAL**

- A.** Contractor shall furnish, at a minimum, all labor, materials, and equipment, and perform all operations required to design furnish, install, test, pump, measure, and maintain the excavation dewatering equipment and water storage systems, including the storage tank, ditches, dikes, sandbags, sumps, electric power supply and distribution as required to dewater the excavations so that the remediation work can be conducted under controlled conditions. Contractor shall demobilize and decontaminate all dewatering equipment and materials after completing the excavation and backfill work.
- B.** The excavation dewatering system design should have redundant features such as adequate standby pumping capacity, valves and piping so that damage to or failure of a principle component of the system will not result in failure of the entire system.
- C.** Conduct localized dewatering in work areas as necessary to perform excavation and restoration work.
- D.** Grade the excavation area using run-on/runoff controls including but not limited to slopes, berms and sumps in conjunction with the dewatering systems to channel water away from the immediate work areas to minimize dewatering and prevent undue impediments to soil inspection and excavation progress. Any grading measures shall prevent stormwater from leaving the Project Site.
- E.** Prevent any impacted water from contacting soils, or water outside of the active excavation area. If environmental contamination results from the Contractor's failure to control impacted water, remove the contamination, to the satisfaction of the Engineer, at no additional cost. Divert surface water away from stockpiles, excavations, and all other impacted materials.
- F.** Install, operate, and remove the dewatering systems in accordance with applicable federal, state, county, and local Laws and Regulations, Permits and generally accepted industry practices.
- G.** Safety of personnel, and protection of off-site facilities and designated on-site facilities during dewatering Work, shall be solely the Contractor's responsibility.
- H.** Weather and site conditions shall be monitored 24 hours per day and seven days per week and dewatering conducted at any time to prevent impacted water runoff from the site.

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**SECTION 02240**  
**DEWATERING**

**3.02 QUALITY CONTROL**

- A.** Dewatering performance shall meet the following requirements:
- 1.** Dewatering area shall be minimized to the extent necessary for the Work being conducted.
  - 2.** Excavations shall be dewatered to maintain a dry work area during the entire period when the excavation remains open.
  - 3.** All water shall be pumped to an on-site temporary storage tank.

**END OF SECTION**

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**SECTION 02260**  
**EXCAVATION****PART 1 - GENERAL****1.01 SECTION INCLUDES:**

- A. Summary
- B. References
- C. Quality Control
- D. Project Conditions
- E. Submittals
- F. Excavation Requirements
- G. Sequencing and Scheduling
- H. Materials
- I. Preparation
- J. Excavation
- K. Sloping and Benching

**1.02 SUMMARY:**

- A. Section includes excavation and handling of materials being removed, as shown on the Drawings.
- B. To the extent possible, excavation, stockpiling and loading of soil and debris, for a portion of the Work designated on the Drawings, shall take place inside of the work limits for that phase of work. The Work will require direct loading of excavated cured ISS spoils for offsite disposal with stockpiling of non-impacted pre-ISS excavation soils for possible reuse.
- C. This Section specifies Work to provide engineering controls in support of the excavation activities.

**1.03 REFERENCES:**

- A. OSHA 29 CFR 1926: Subpart P – Excavations.

**1.04 QUALITY CONTROL:**

- A. Contractor's Land Surveyor shall stake excavation boundaries indicated on the Drawings and perform initial survey as specified in Specifications Section 01720 - Surveying.
- B. Contractor shall perform surveying to record elevations during the course of the excavation Work. During performance of the Work, Contractor shall employ all equipment necessary for control of excavation depths, lines, and grades within required tolerances.

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**SECTION 02260**  
**EXCAVATION**

- C.** Verification of final excavation horizontal limits and depths shall be accomplished by survey provided by Contractor's Land Surveyor and in a manner that is mutually acceptable to the Contractor and the Engineer. During the progress of Work, the Contractor shall provide survey data as the excavation progresses that consist of the following:
- 1.** Horizontal limits of completed excavation in sufficient detail to determine limits of the material removed.
  - 2.** Vertical limits of excavation consisting of top of final grade or excavation limit in sufficient detail to verify quadrant elevations and to establish the progress of the completed Work.
- D.** Contractor personnel and equipment shall meet the training standards and requirements of OSHA 29 CFR 1926: Subpart P-Excavations.

**1.05 PROJECT CONDITIONS:**

- A.** Excavation will occur in a mixed commercial - residential neighborhood. Odors, noise, dust, and vapors must be controlled accordingly and as described in the Contract Documents.
- B.** Debris, concrete foundations, cable, and abandoned pipe may be encountered in the excavation area.
- C.** Excavation will be in granular soils and fill materials; groundwater is not expected to be encountered during excavation. Historical groundwater elevations at the project Site are between 7 and 14 feet below ground surface. The limited excavations in support of the ISS Treatment have been designed to minimize the impact of groundwater.
- D.** Contractor shall provide materials, and install all necessary controls required for stability of the excavation and to protect adjacent roadways and structures.

**1.06 SUBMITTALS:**

- A.** Contractor shall prepare and submit a Technical Execution Plan in accordance with the procedures set forth in Specifications Section 01330 – Submittal Procedures. The Engineer has designed a sloped excavation system around the perimeter of the site as shown on the Drawings. Contractor's Technical Execution Plan shall include a detailed proposal for investigation, design and construction of the excavations.

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**SECTION 02260**  
**EXCAVATION**

- B.** The Technical Execution Plan will document the Contractor's proposed procedures for managing the excavation dewatering, staging, tracking, and stockpiling the excavated soil.

**1.07 EXCAVATION REQUIREMENTS:**

- A.** The Drawings show the limits and elevations of the excavation areas for this Work.
- B.** The Contractor shall lay out the Work and excavate soil to the horizontal and vertical limits of excavation with allowances for stable slopes or use of excavation support.
- C.** Contractor shall erect and maintain barriers as shown on the drawings and as specified in Specifications Section 01500 – Mobilization and Temporary Facilities and deemed necessary by the Engineer around open excavations to provide any other necessary safety precautions to safely secure the site both during and after Work hours.
- D.** The Contractor is responsible for excavation slope stability. Excavation Work shall be in compliance with applicable OSHA Regulations. The Engineer shall have the authority to address concerns or stop Work regarding excavation slope or shoring stability. The Contractor shall immediately notify the Engineer if slope sidewall instability is noticed.
- E.** Work shall be performed in a manner that does not disturb or damage existing structures, utilities, monitoring wells, or other facilities not indicated to be removed, unless the removal of such items is shown on the Drawings. Damaged facilities shall be repaired or replaced at the Contractor's expense as determined by the Engineer.
- F.** Contractor shall maintain a written record of daily progress of the excavations, including all survey observations and data, and submit a copy to the Engineer at the Weekly Progress Meetings, or as otherwise requested by the Engineer.
- G.** The Contractor shall comply with Occupational Safety and Health Act Regulations (29 CFR 1926.651):
- 1.** These regulations include but are not limited to specific excavation requirements including the following:
    - a.** Removal of surface encumbrances.
    - b.** Determination of underground installations.
    - c.** Providing access and egress.
    - d.** Protection of nearby structures.
    - e.** Preventing exposure to vehicular traffic.

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## SECTION 02260 EXCAVATION

- f. Preventing exposure to falling loads.
  - g. Providing a warning system for mobile equipment.
  - h. Preventing exposures to hazardous atmospheres.
  - i. Preventing hazards associated with water accumulation.
  - j. Protection of employees from loose rock or soil.
  - k. Inspections.
- 2. The Contractor shall be responsible for meeting requirements for excavation protection in OSHA 29 CFR 1926.652, including providing a “competent person” to classify soils and verify that the excavation slopes shown on the Drawings are protective of worker safety.
- H. Contractor shall control dust emissions and odors during excavation activities in accordance with the requirements of the Specifications.
- I. Contractor shall protect all existing structures outside the limits of excavation areas. If Contractor damages any structures, Contractor shall repair or replace the damaged structure to the original construction standards at Contractor’s own expense without reimbursement.
- J. Contractor shall notify all utility companies and locate all underground utilities prior to starting excavation Work. Contractor shall be responsible for protection of utilities. If Contractor damages any utilities, Contractor shall repair or replace the damaged utility to the original construction standards at Contractor’s own expense without reimbursement.
- K. The Contractor shall sequence and stage excavation operations as specified in the Technical Execution Plan submitted in accordance with Specifications Section 01330 – Submittal Procedures to meet the following requirements:
  - 1. Minimize the amount of water generated by excavation dewatering described in Specifications Section 02240 – Dewatering.
  - 2. Balance the rate of excavation with the rates of on-site material management and off-site transportation operations described in Specifications Sections 02120 – Off-site Transportation and Disposal to ensure sufficient capacity for stockpiling and transportation.

### 1.08 SEQUENCING AND SCHEDULING:

- A. Contractor shall conduct excavation in accordance with the milestones set forth in Bid Form Schedule F, Construction Milestones.

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**SECTION 02260**  
**EXCAVATION**

- B.** Contractor shall sequence excavation work in accordance with the ISS Treatment Work.
- C.** Contractor shall conduct excavation support installation and removal activities in coordination with Backfill and Grading Work specified in Specifications Section 02300 – Backfill and Grading.
- D.** Contractor shall locate excavation support and controls in accordance with the limits of excavation shown on the Drawings.
- E.** Contractor shall coordinate the installation of excavation supports and controls with the installation and operation of excavation dewatering systems described in Specifications Section 02240 – Dewatering.

**PART 2 - PRODUCTS****2.01 MATERIALS:**

- A.** Material and equipment are not specified herein, but shall be furnished as deemed necessary by Contractor. Contractor shall furnish and install all materials necessary for excavation support and controls. The materials and equipment used for excavation support and controls may be new or used but must be suitable for the Work and be maintained in good condition.
- B.** All temporary excavation support and controls shall remain the property of the Contractor. All temporary excavation support and controls materials shall be decontaminated and removed from the project site at the completion of the Work.

**PART 3 – EXECUTION****3.01 PREPARATION:**

- A.** The Contractor shall comply with the requirements of the utility owners for protection of underground utilities.

**3.02 EXCAVATION:**

- A.** Excavation:
  - 1.** The Contractor shall excavate soil and other material from the existing grade elevations and extents shown on the Drawings.

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**SECTION 02260**  
**EXCAVATION**

2. The Contractor shall excavate using the equipment and procedures described in the Technical Execution Plan submitted as specified in Specifications Section 01330 – Submittal Procedures.
3. Excavated material shall be loaded directly into trucks when possible, or placed directly in the excavated material stockpile area.

**3.03 SLOPING AND BENCHING:**

- A. Excavation slopes and benches shall conform to OSHA requirements at all times.
- B. Sloping or benching for excavations greater than four feet deep shall be in accordance with the Drawings, unless alternative slopes are deemed appropriate due to site conditions as determined by the Contractor's Competent Person and the Engineer.
- C. Contractor shall provide written documentation in Contractor's Daily Report for sloping and benching, including acceptable grades and dimensions, soil types, and soil conditions.
- D. Contractor shall inspect excavations daily to verify stability of slopes, benches, and temporary sheet piling.

**END OF SECTION**



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**SECTION 02300**  
**BACKFILLING AND GRADING**

**PART 1 – GENERAL**

**1.01 SECTION INCLUDES:**

- A. Summary
- B. References
- C. Submittals
- D. Quality Control
- E. Project Conditions
- F. Gravel Backfill
- G. Road Base
- H. Surveying
- I. Preparation
- J. Placement of Backfill
- K. Site Grading and Restoration
- L. Maintenance

**1.02 SUMMARY:**

- A. The Contractor shall provide all materials, equipment, and labor to place and compact backfill and grade to the final elevations in accordance with this section and the Drawings.

**1.03 REFERENCES:**

- A. American Society for Testing and Materials (ASTM):
  - 1. ASTM D 1557, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (Modified Proctor).
  - 2. ASTM D 2487, Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System).
  - 3. ASTM D 2922, Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods.
  - 4. ASTM D 3017, Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).
- B. New York State Department of Environmental Conservation (NYSDEC):

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**SECTION 02300**  
**BACKFILLING AND GRADING**

1. NYSDEC Title 6 of the New York Codes, Rules, and Regulation (NYCRR) Part 375, Environmental Remediation Programs.

**1.04 SUBMITTALS:**

- A. Contractor shall submit written documentation showing conformance of the materials and constructed work with the Specifications within five days after test results are obtained.
- B. For backfill, Contractor shall submit written certification, signed by the material supplier, stating that the material meets or exceeds the specified requirements. Information shall be submitted to Engineer for review and approval no less than fourteen calendar days prior to scheduled delivery of specified material to the Project Site.
- C. Contractor shall submit samples of imported common backfill material to Engineer for chemical analyses. At least one sample shall be submitted for each borrow source at least three weeks prior to being needed on Project Site.
- D. Contractor shall identify primary and backup backfill borrow sources in the TEP.

**1.05 QUALITY CONTROL:**

- A. Contractor shall retain the services of a New York State Department of Transportation (DOT) approved soils testing laboratory to document conformance of material type and compaction of backfill and paving materials with the Specifications.

**1.06 PROJECT CONDITIONS:**

- A. Work shall be performed in a manner that does not disturb existing utilities, structures, or other facilities not indicated to be removed within the project limits.
- B. Work shall be coordinated with ISS Treatment and restoration.

**PART 2 – PRODUCTS**

**2.01 REUSE SOILS BACKFILL**

- A. Restoration Reuse Soils shall be those soils excavated from the site free from odor staining and sheens which is hard, durable sand and gravel, and shall be free from ice and snow, roots, sod, rubbish, and any other deleterious or organic matter. It shall be

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## SECTION 02300 BACKFILLING AND GRADING

chemically clean, in accordance with NYSDEC 6 NYCRR Part 375 Subpart 6 (d) (375.6 (d)) values, as sampled and analyzed by the Engineer.

### 2.02 SELECT FILL:

- A. Select Fill (bank run gravel or equivalent) shall be hard, durable sand and gravel, and shall be free from ice and snow, roots, sod, rubbish, and any other deleterious or organic matter. It shall be chemically clean, in accordance with NYSDEC 6 NYCRR Part 375 Subpart 6.7 (d) (375.6.7 (d)) values, as sampled and analyzed by the Engineer. It shall conform to the following gradation requirements:

Sieve Size	Percent Passing
3-inch	100
2-inch	90-100
1-inch	70-90
No.4	80-30
No. 200	0-15

### 2.03 SUBBASE:

- A. Subbase (NYSDOT #Type 2) shall be hard, durable sand and gravel, and shall be free from ice and snow, roots, sod, rubbish, and any other deleterious or organic matter. It shall be chemically clean, in accordance with NYSDEC 6 NYCRR Part 375 Subpart 6 (d) (375.6 (d)) values, as sampled and analyzed by the Engineer. It shall be supplied from a NYSDOT approved facility and conform to the following gradation requirements:

Sieve Size	Percent Passing
2-inch	100
No. 4	60
No. 40	5 - 40
No. 200	0 – 10

### 2.04 TOPSOIL:

- A. Topsoil shall be fertile, friable, natural loam. Topsoil shall be free from ice and snow, roots, sod, rubbish, and any other deleterious or organic matter. It shall be chemically clean, in accordance with NYSDEC 6 NYCRR Part 375 Subpart 6 (d) (375.6 (d)) values, as sampled and analyzed by the Engineer. It shall have the following approximate analysis, or equivalent approved by Engineer:

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## SECTION 02300 BACKFILLING AND GRADING

Clay	10% - 30%
Sand	10% - 60%
Silt	30% - 70%
Organic Matter	> 5%
% Passing a 2-inch Sieve	100%
pH	5.5 - 7.0

### 2.05 ROAD BASE, PARKING BASE MATERIAL:

- A. Subbase (NYSDOT #Type 2) shall be hard, durable sand and gravel, and shall be free from ice and snow, roots, sod, rubbish, and any other deleterious or organic matter. It shall be chemically clean, in accordance with NYSDEC 6 NYCRR Part 375 Subpart 6 (d) (375.6 (d)) values, as sampled and analyzed by the Engineer. It shall be supplied from a NYSDOT approved facility and conform to the following gradation requirements:

Sieve Size	Percent Passing
2-inch	100
No. 4	25 - 60
No. 40	5 - 40
No. 200	0 - 10

- B. Road base material for temporary haul roads and the Soil Stockpile and Staging Area shall be reused as site parking area restoration material.

### 2.06 CONTROLLED LOW STRENGTH MATERIAL (CLSM):

- A. Controlled low strength material (CLSM) shall consists of mixing and placing at the locations shown on the plans or where ordered by the Engineer. CLSM shall be as per NYSDOT Item Specification Section 204. The contractor shall provide the Engineer the certification that the CLSM will have a 28 day compressive strength between 40 psi and 150 psi. It shall be supplied from a NYSDOT approved facility and conform to the following gradation requirements:

Sieve Size	Percent Passing
No. 10	100
No. 200	20 (maximum)

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**SECTION 02300**  
**BACKFILLING AND GRADING**

**PART 3 – EXECUTION**

**3.01 SURVEYING:**

- A. The Contractor shall survey the final surface elevation of each layer of completed backfill with a New York State Registered Land Surveyor for payment quantity and as-built purposes. Final thickness of placed backfill shall vary no more than 10% from the specified thickness.

**3.02 PREPARATION:**

- A. Backfilling shall not proceed until Engineer has approved the completion of excavation in each area of the Project Site and documented bottom conditions including sampling as required and as-built survey.
- B. Backfilling shall not be done when the ground or backfill is frozen or too wet to compact. The Contractor shall dewater the excavations as necessary to allow backfilling to proceed.

**3.03 PLACEMENT OF BACKFILL:**

- A. Backfill not within the target area shall be placed in uniform layers not exceeding 12 inches loose lift thickness.
- B. Backfill shall be compacted to a minimum of 90 percent of the material's maximum dry density, and within 3% of optimum moisture as determined by the Modified Proctor.
- C. Contractor shall provide field compaction tests for each lift and at a minimum of one per every 1,000 square feet.
- D. Contractor shall place and compact, if required, Gravel and Topsoil in the excavations up to the final grade as indicated on the Drawings.
- E. Backfill within the target area shall consist of a minimum 4-foot soil cover.

**3.04 SITE GRADING AND RESTORATION:**

- A. Contractor shall grade unpaved areas to the contours indicated on the Drawings. The soil surface shall be shaped to provide a smooth transition to existing grade at the limits of the disturbed areas.

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**SECTION 02300**  
**BACKFILLING AND GRADING**

- B. Contractor shall shape and compact fill with uniform levels or slopes between points where elevations are shown on the Drawings, or between such points and existing grades.
- C. Contractor shall smooth the finished surfaces for general site grading within tolerance of two inches above or below the required elevation.
- D. Contractor shall grade areas adjacent to structures to achieve drainage away from the structures and to prevent ponding.

**3.05 MAINTENANCE:**

- A. Contractor shall protect newly graded areas from traffic and erosion. The Work shall be sequenced to minimize disturbance of completed areas.
- B. Where completed areas are disturbed by subsequent project operations or adverse weather, fill and reshape eroded areas until acceptance of the Work.

**END OF SECTION**





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## **SECTION 02900 SEEDING**

### **PART 1 – GENERAL**

#### **1.01 SECTION INCLUDES:**

- A. Summary
- B. Submittals
- C. Quality Control
- D. Delivery, Storage, and Handling
- E. Project Conditions
- F. Fertilizer
- G. Lime
- H. Seed
- I. Water
- J. Mulch
- K. Erosion Control Mat
- L. Application of Temporary Grass Seed
- M. Application of Seed and Protective Cover
- N. Establishment of Grass

#### **1.02 SUMMARY:**

- A. This section includes establishing a stand of grass on all disturbed work areas not to be paved or graveled.

#### **1.03 SUBMITTALS:**

- A. Contractor shall submit manufacturer's certification that seed, lime, fertilizer, and mulch binder meet specification requirements. Seed submittal shall include a listing of all seed types and proportions in seed mixtures.
- B. Contractor shall submit seed bag tags, receipts, truck weight tickets, and other information necessary to confirm application rates and types for all seed, fertilizer, lime and mulch, as applicable.
- C. Contractor shall submit actual proposed types and rates of application of lime, fertilizer and seed based on local conditions and planting season.

#### **1.04 QUALITY CONTROL:**

- A. Contractor shall contact the local agricultural extension office to establish the optimal seed and fertilizer mixes, including any recommended soil testing.

Seeding	July 11, 2016	02900
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**SECTION 02900**  
**SEEDING**

- B. Seeding shall be accomplished according to standard local practice and in compliance with requirements of applicable state and federal regulations.

**1.05 DELIVERY, STORAGE, AND HANDLING:**

- A. Contractor shall deliver packaged materials in containers showing weight, analysis and name of manufacturer.
- B. Contractor shall protect materials from deterioration during delivery, and while stored at the site.

**1.06 PROJECT CONDITIONS:**

- A. Contractor shall perform seedbed preparation and seeding as soon as possible after completion of remediation, backfilling and grading in disturbed areas.
- B. Contractor shall proceed with planting only when existing and forecasted weather conditions permit.

**PART 2 – PRODUCTS**

**2.01 FERTILIZER:**

- A. Fertilizer requirements shall be specified in the Contractor's Technical Execution Plan (TEP).

**2.02 LIME:**

- A. Lime requirements shall be specified in the Contractor's TEP.

**2.03 SEED:**

- A. Seed mixes for permanent vegetation shall be a blend of Red Fescue, Rye, and Kentucky Blue, applied at a rate of 75 lbs/acre, or approved equivalent for the site location.
- B. The variety and blends of seed may be added, deleted or substituted as appropriate to take advantage of proven varieties and mixtures and to account for changes of season and weather. Proposed changes to the seed mix shall be submitted to the Engineer for approval prior to use.
- C. Seed that has become wet, moldy or otherwise damaged will not be acceptable.

Seeding	July 11, 2016	02900
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**SECTION 02900  
SEEDING**

**2.04 WATER:**

- A. Water shall be clean and potable.

**2.05 MULCH:**

- A. Mulch shall be clean long-fibered hay or straw, consisting of stalks of oats, wheat, barley, rye, or excelsior wood fibers, reasonably free of noxious weed seeds. Application rate is 1½ - 2 tons/acre.

**2.06 EROSION CONTROL MAT:**

- A. Erosion control mat shall consist of biodegradable mats made from woven jute, or suitable alternate approved by the Engineer. Erosion control mats shall be utilized wherever planting is required on slopes greater than 5%.

**PART 3 – EXECUTION**

**3.01 APPLICATION OF TEMPORARY GRASS SEED:**

- A. Temporary seeding shall be applied to areas lacking vegetation if no construction activities will be performed in the area for more than 30 days.
- B. Contractor shall uniformly apply seed during optimum planting season and rates indicated on the Drawings, unless otherwise approved by the Engineer.

**3.02 APPLICATION OF SEED AND PROTECTIVE COVER:**

- A. For permanent seeding, apply seed and mulch as specified in the following paragraphs.
- B. Contractor shall apply lime at a rate determined based on soil test results and as approved by the Engineer.
- C. Contractor shall uniformly apply fertilizer at the rates indicated in the TEP or as otherwise determined based on soil test results and approved by the Engineer. Fertilizer shall be applied as not to run-off into local storm sewer system.
- D. Fertilizer, seed and mulch may be placed using hydroseeding, or other suitable mechanical methods that will not damage the completed Work.
- E. Seeding for permanent vegetation shall be performed during the first optimum planting season following completion of the work in an area.

Seeding	July 11, 2016	02900
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**SECTION 02900**  
**SEEDING**

- F. Immediately after seeding, in areas designated for mulch, the Contractor shall spread mulch uniformly over the seeded area
- G. Erosion control mat shall be utilized where planted slopes exceed 5%.

**3.03 ESTABLISHMENT OF GRASS:**

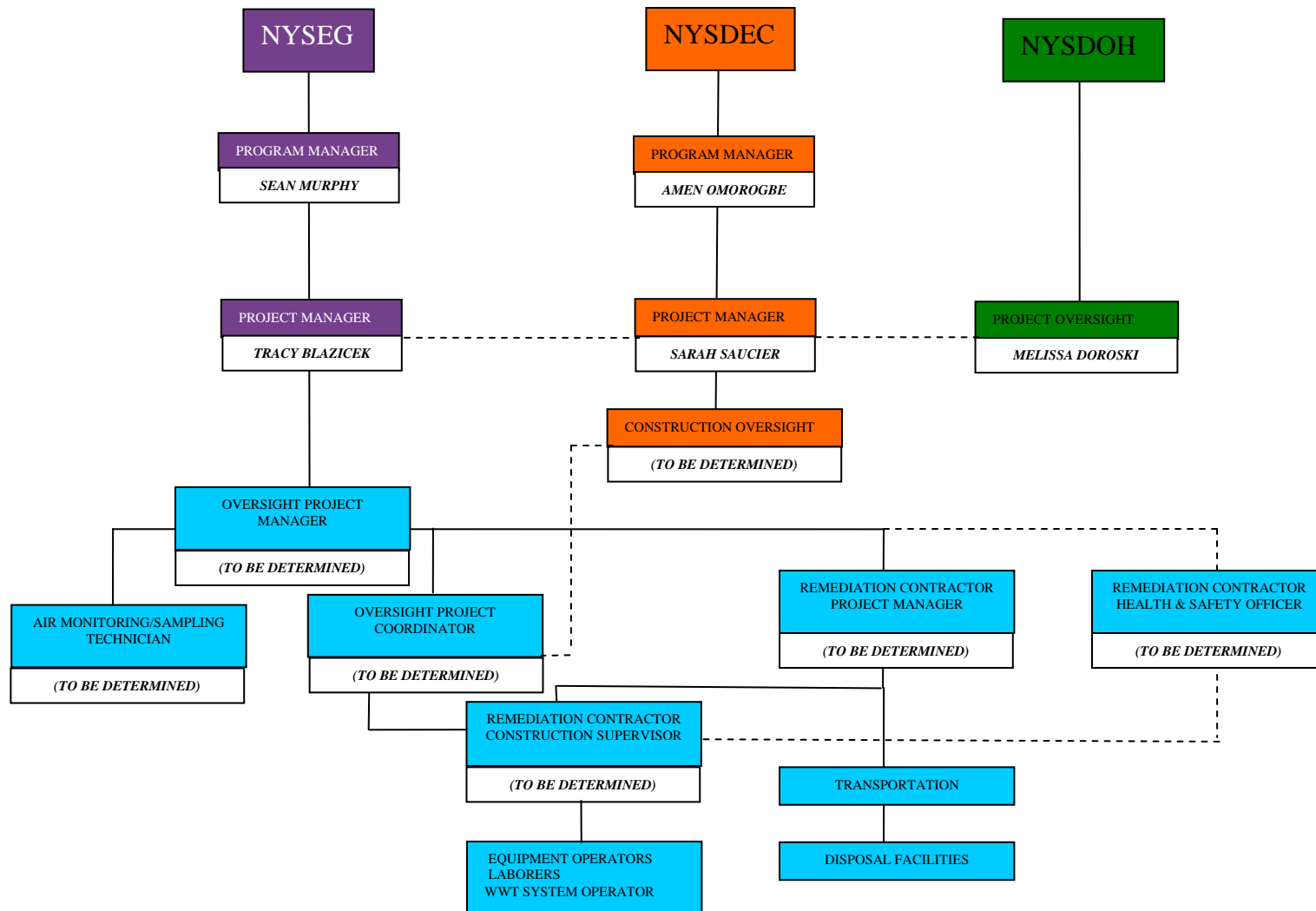
- A. Contractor shall begin maintenance of seeded areas immediately after seed placement. Contractor shall water; repair washed or eroded areas, as well as, protect and maintain the seeded areas until a final satisfactory stand of grass is obtained.
- B. Engineer will periodically inspect the seeded areas to verify that a satisfactory stand of grass is obtained in all areas seeded. A satisfactory stand of grass is defined as a cover of living plants, after true leaves are formed, of the seed species applied, in which gaps larger than one square foot do not occur. Bare spots shall be reseeded, and the total bare areas shall not comprise more than one percent of the total seeded area. Contractor shall re-seed bare and eroded areas as determined necessary by the Engineer.
- C. Contractor shall mow the property twice once a satisfactory stand of grass has been established.
- D. Contractor shall warranty planting for 90 days following establishment of a satisfactory stand of grass.

**END OF SECTION**

## **Appendix A**

### **Organization Structure**

ORGANIZATIONAL STRUCTURE FOR REMEDIATION ACTIVITIES AT  
NORWICH FORMER MANUFACTURED GAS PLANT  
OFF-SITE TARGET AREA



## **Appendix B**

### **Community Air Monitoring Plan**



# Final Phase 1 Remedial Design Report Community Air Monitoring Plan

**Site:**

Norwich Former Manufactured Gas Plant Off-site Target Area  
Front Street  
Norwich, Chenango County, New York

**Submitted to:**

New York State Department of Environmental Conservation  
Department of Environmental Remediation  
625 Broadway  
Albany, NY 12233-7012

**Prepared for:**

New York State Electric & Gas Company  
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Binghamton, New York 13902-5224

**Prepared by:**

AECOM  
40 British American Blvd.  
Latham, New York 12110

July 2016

AECOM Project No. 60345362.1





# Final Phase 1 Remedial Design Report Community Air Monitoring Plan

**Site:**

Norwich Former Manufactured Gas Plant  
Off-site Target Area  
Front Street  
Norwich, Chenango County, New York

Author: Scott T. McDonough

Title: Environmental Engineer

**Submitted to:**

New York State Department  
of Environmental Conservation  
Department of Environmental Remediation  
625 Broadway  
Albany, NY 12233-7012

Date: 7/11/2016

Reviewer: Scott Underhill, P.E.

**Prepared for:**

New York State Electric & Gas Company  
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Title: Project Manager

Date: 7/11/2016

**Prepared by:**

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July 2016

AECOM Project No. 60345362.1

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## **1.0 INTRODUCTION**

A Community Air Monitoring Plan (CAMP) requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of the site when certain activities are in progress at contaminated sites. This CAMP was prepared for work associated with the Norwich Former Manufactured Gas Plant (MGP) off-site target area located in the City of Norwich, Chenango County, New York and supplements the *Design Work Plan*.

## **2.0 PURPOSE**

This CAMP is a companion document to the site-specific Health and Safety Plan (HASP). The HASP is directed primarily toward the protection of workers within the designated work zones. The CAMP is directed primarily toward the protection of the community downwind of site activities (i.e., off-site receptors including residences and businesses). This CAMP identifies action levels and subsequent responses to insure the safety of the downwind community. In addition, the CAMP aids in affirming that work activities do not spread constituents off-site through the air.

### **3.0 AIR MONITORING**

The constituents of concern at the Norwich former MGP off-site target area are volatile organic compounds (VOCs) and particulates. VOCs will be monitored using a photo-ionization detector (PID) with a 10.2 eV lamp. Particulates will be monitored using a particulate air monitor equipped with a micro-processor to measure real-time measurements of airborne particulate concentrations in micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ).

Real-time air monitoring field logs will be maintained to allow for future interpretation of the logged data. Site conditions, weather conditions, work activities, implemented engineering controls, and periodic real-time VOC and total particulate readings will be recorded on field logs. Copies of all field logs will be available for review on a daily basis.

#### **3.1 VOC Monitoring, Response Levels, and Actions**

VOCs will be monitored at the upwind and downwind perimeter of the site on a continuous basis or as otherwise specified. Upwind concentrations will be measured to establish site specific background concentrations. In the event of minimal wind or frequent changes in wind direction, multiple locations will be monitored (i.e., three monitoring locations surrounding the work area).

Monitoring instrumentation will include a real-time PID monitor for VOCs equipped with a 10.2-eV lamp, which will be calibrated daily with a 100 parts per million (ppm) isobutylene air standard. Monitoring will be continuously logged by each of the air monitoring instruments during the course of daily operations and each instrument will have a visible light and telemetry/pager system to indicate when an action level has been exceeded. Each air monitoring instrument will be continuously downloaded and saved electronically to a dedicated computer located on-site. Each 15 minute average reading will be recorded during working hours along with the date, time, sampling location, wind direction, and weather conditions.

The *Vapor Emission Response Plan* describes the action levels for perimeter VOC air monitoring and the associated responses to each level.

#### **3.2 Particulate Monitoring, Response Levels, and Actions**

Particulate concentrations will be monitored at the upwind and downwind perimeter of the site on a continuous basis or as otherwise specified. Upwind concentrations will be measured to establish site-specific background concentrations. In the event of minimal wind or frequent changes in wind direction, multiple locations will be monitored (i.e., three monitoring locations surrounding the work area).

Particulate monitoring will be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. Each particulate monitor will be calibrated daily with a filtered air sample. Each air monitoring instrument will be continuously downloaded and saved electronically to a dedicated computer located on-site.

The table below describes the action levels for perimeter particulate air monitoring and the associated responses to each level.

Action Level	Response
Downwind particulate concentrations 100 ug/m <sup>3</sup> greater than upwind particulate monitor sustained over 15 minute average	Dust suppression techniques are employed
Downwind particulate concentrations 150 ug/m <sup>3</sup> greater than upwind particulate monitor sustained over 15 minute average	Work halted and dust suppression techniques evaluated. Work continues once dust suppression techniques are proven successful

## **Appendix C**

### **Quality Assurance Project Plan**



# Final Phase 1 Remedial Design Report Quality Assurance Project Plan

**Site:**

Norwich Former Manufactured Gas Plant Off-site Target Area  
Front Street  
Norwich, Chenango County, New York

**Submitted to:**

New York State Department of Environmental Conservation  
Department of Environmental Remediation  
625 Broadway  
Albany, NY 12233-7012

**Prepared for:**

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July 2016

AECOM Project No. 60345362.1





# Final Phase 1 Remedial Design Report Quality Assurance Project Plan

**Site:**

Norwich Former Manufactured Gas Plant  
Off-site Target Area  
Front Street  
Norwich, Chenango County, New York

Author: Kelly Lurie

Title: Environmental Scientist

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Date: 7/11/16

Reviewer: Scott Underhill, PE

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December 2015

AECOM Project No. 60345362.1

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### **Tables**

Table 1	Sample Bottle, Volume, Preservation, and Holding Time Summary
Table 2	QA/QC Sample Summary

### **Attachments**

Attachment A	Sample Chain of Custody Form
Attachment B	Sample Identification Naming Convention

## **1 INTRODUCTION**

### **1.1 Purpose and Objective**

This *Quality Assurance Project Plan (QAPP)* provides a description of the sampling and laboratory procedures/protocols to be used in support of the remedial design associated with the Norwich former manufactured gas plant (MGP) site located in Norwich, Chenango County, New York. The fundamental purpose of the QAPP is to ensure that quality analytical data will be generated to support the project in a manner consistent with the Data Quality Objectives (DQOs) as specified herein. This QAPP is designed to be used in conjunction with the New York State Department of Environmental Conservation (NYSDEC) approved *Remedial Design Report, Off-Site Target Area*, with regards to specific project objectives and field sampling activities. To the extent that discrepancies exist between this QAPP and the *Remedial Design Report*, the *Remedial Design Report* shall control. This QAPP has been prepared in accordance with the NYSDEC DER-10, Technical Guidance for Site Investigation and Remediation.

The primary objective of this work is to execute the remedial design as detailed in the design plan. Site investigation work has been completed for this site; therefore field sampling for chemical analysis is limited to determining acceptability of soil for use as backfill in excavated areas and proper handling of excavated soil and wastewater and includes the following:

- Waste characterization for excavated soil;
- Waste characterization for wastewater;
- Sampling of non-impacted excavated material for potential reuse on-site during restoration activities; and
- Sampling of imported fill material, as needed, to confirm compliance with DER-10.

### **1.2 Project Personnel**

The general responsibilities of key AECOM project personnel are listed below.

AECOM Project Manager – will have responsibility for overall project management and coordination with NYSEG, and will coordinate the initiation and implementation of the design tasks including the field sampling.

AECOM Task Leaders/Field Team Leaders – These individuals and roles will share the responsibility of implementing and coordinating the field and office project activities.

### **1.3 Site Description and Location**

Information including site description, location, history, previous investigations, and current conditions are summarized in the main text of the remedial design report.

## **2 SAMPLE COLLECTION**

### **2.1 Field Sampling Procedures**

#### **2.1.1 Soil Samples**

Soil samples will be collected using disposable trowels or decontaminated hand tools and placed in pre-cleaned sample containers provided by the laboratory performing the analysis. Samples will be stored at 4° Celsius until delivered to and analyzed by the laboratory.

With the exception of samples intended for analysis of volatile organic compounds (VOCs), soil samples will be composites of discrete samples collected from about three to five locations chosen to be representative of the area being sampled. The discrete samples will be mixed using a new, clean disposable Ziploc bag for each sample to form a homogenized composite sample that will be used to fill the sample containers.

Only discrete grab samples should be collected for VOC analysis to prevent loss during sampling procedures.

#### Soil Samples for Waste Characterization

Samples will be collected from excavated soil stockpiled onsite to determine the appropriate waste handling requirements. It is expected that samples will be collected at a rate of approximately one sample per 500 cubic yards (CY); however this will be confirmed based on the requirements of the contracted waste facility.

It is expected that the soil samples collected for waste characterization will be analyzed for the following chemical analyses. This list will be compared to the requirements of the contracted waste facility once determined.

- TCLP Volatiles – SW846 Method 1311/8260
- TCLP Semivolatiles – SW846 Method 1311/8270
- TCLP Metals - SW 846 Method 1311/6000/7000 Series
- TCLP Pesticides/Herbicides - SW846 Method 1311/8080/8151
- PCBs - SW 846 Method 8082
- Reactive Sulfide - SW 846 Chapter 7.3.3.2
- Reactive Cyanide - SW 846 Section 7.3.3.2
- Flashpoint - ASTM D-93
- Ignitability - SW 846 Method 1030
- Reactivity - SW 846 Section 7
- Corrosivity - SW 846 Section 7
- Percent Solids
- pH - SW 846 Method 9045
- Total Cyanide - SW 846 9012
- Paint Filter Test - SW 846 9095

#### Soil Samples for Imported Soil or Reuse of Excavated Soil

Soil will be required as backfill to implement the remedial design. Any source proposed for use as backfill will be shown to not exceed the allowable constituent levels for imported fill or soil per Section 5.4 of DER-10. It is anticipated that either clean backfill will be imported to the site from an approved source, or if determined appropriate, excavated site soil that is not impacted may be re-used on the site. Soil

samples for backfill approval will be collected at a frequency in accordance with DER-10 Table 5.4(e)10 and analyzed for the following DER-10 constituents:

- Volatiles – SW846 Method 8260
- Semivolatiles – SW846 Method 8270
- Metals - SW 846 Method 6000/7000 Series
- Total Cyanide – SW 846 Method 9012
- Hexavalent Chromium – SW 846 Method 7196A
- Pesticides/Herbicides - SW846 Method 8080/8151
- PCBs - SW 846 Method 8082

### **2.1.2 Wastewater Sampling**

Wastewater samples will be transferred directly into pre-cleaned sample collection containers supplied by the laboratory performing the analyses. All necessary preservatives will be added to the sample containers at the laboratory prior to being shipped to the site (see Section 3.5). Samples will be stored at 4° Celsius until delivered to and analyzed by the laboratory.

Samples of wastewater will be analyzed before being transported to a permitted facility for proper treatment and disposal and/or release. It is expected that the water samples collected for waste characterization will be analyzed for the following chemical analyses; however, this list will be compared to the requirements of the contracted waste facility or the facility responsible for approving and accepting the waste once determined.

- SVOCs - SW 846 Method 8270
- VOCs - SW 846 Method 8260
- Metals - SW 846 Method 6000/7000 Series
- Total Cyanide - SW 846 9012
- Reactivity - SW 846 Section 7
- Corrosivity - SW 846 Section 7

## **2.2 Small Equipment Decontamination**

Cross contamination is minimized by the use of vendor-decontaminated, dedicated, disposable equipment to the extent practical. For the sampling detailed in this QAPP, only new, disposable equipment will likely be used.

To avoid cross contamination, sampling equipment (defined as any piece of equipment which may contact a sample) will be decontaminated according to the following procedures. Field equipment rinsate blanks are generated and analyzed to monitor the effectiveness of field decontamination procedures.

Small equipment decontamination for non-disposable equipment such as soil trowels, mixing bowls, and scoops will be accomplished using the following procedures:

- Alconox (or equivalent) and potable water wash;
- Potable water rinse;
- If the equipment is being used for the collection of samples for metals analyses it will then be rinsed with a 10% reagent grade nitric acid solution.
- Distilled/deionized water rinse;

Decontamination will include scrubbing/washing with a laboratory grade detergent (e.g. Alconox) to remove visible contamination, followed by potable (tap) water and analyte-free water rinses. Tap water

may be used from any treated municipal water system; the use of an untreated potable water supply is not an acceptable substitute.

Equipment should be allowed to dry prior to use. Steam cleaning or high pressure hot water cleaning may be used in the initial removal of gross, visible contamination.

### **3 SAMPLE CUSTODY, IDENTIFICATION & TRACKING**

#### **3.1 Sample Identification**

Each sample collected during the project will have a unique identification number. This number, date of collection, and type of analysis will be placed on each sample container after the sample is collected. See Attachment B for sample identification naming convention for air, water, and confirmatory samples. A site map will be used throughout the project to denote the area or point that a soil disposal or reuse sample represents.

#### **3.2 Chain-of-custody**

A chain-of-custody will accompany all samples from the point of sampling to delivery of the samples to the laboratory. The chain-of-custody will be a record of the location where the sample was collected, the date and time collected, the number of containers collected, the type(s) of analyses requested, special remarks or requests, and the signature of each custodian of the samples. The complete chain-of-custody will be included in all hard copies of reports. See Attachment A for sample chain-of-custody form.

Upon sample receipt, laboratory personnel will be responsible for sample custody. The laboratory sample custodian will verify sample integrity and compare the cooler contents against the field chain-of-custody. If a sample container is broken or leaking it will be noted on the chain-of-custody form and NYSEG project personnel will be immediately notified. If the sample custodian observes any labeling or descriptive errors, NYSEG project personnel will be contacted immediately to resolve any discrepancies. After all discrepancies (if any) are resolved, the laboratory will acknowledge receipt of the samples (i.e., by signing and dating the chain-of-custody) and the completed chain-of-custody will be included in all hard copies of reports and become a permanent part of the project records.

#### **3.3 Holding Times and Sample Transport**

Holding times will be calculated from the time the sample is collected to the subsequent extraction, if necessary, or analysis. Once sample containers are filled, they will be immediately placed in a cooler on ice or synthetic ice packs to maintain the samples at 4° C. Upon shipment, the completed chain-of-custody forms will be signed and placed in a sealed Ziploc bag in the cooler. The completed shipping cooler will be closed for transport with shipping tape. All samples will be delivered to the laboratory by same day courier or overnight delivery in sealed coolers with ice.

#### **3.4 Laboratory Sample Receipt and Tracking**

Upon receipt at the laboratory, a laboratory representative inspects the samples for integrity and checks the shipment against the chain-of-custody. Discrepancies are addressed at this point and documented on the chain-of-custody form. Discrepancies are reported to the Laboratory Project Manager who contacts the NYSEG project personnel.

When the shipment and the chain-of-custody are in agreement, the custodian assigns each sample a unique laboratory number. This number is affixed to each sample bottle. The custodian then enters the sample and analysis information into the laboratory computer system.

##### **3.4.1 Laboratory Sample Custody**

The laboratory must satisfy the sample chain-of-custody requirements by implementing the following procedures for laboratory/sample security:

- Samples are stored in a secure area;



- Access to the laboratory is through a monitored area;
- Visitors sign a visitor's log and are escorted while in the laboratory;
- Only the designated sample custodians have keys to sample storage area(s); and
- Transfers of samples in and out of storage are documented.

### **3.4.2 Sample Storage, Security, and Disposal**

While in the laboratory, the samples and aliquots that require storage at  $4^{\circ}\text{C} \pm 2^{\circ}\text{C}$  are maintained in a locked refrigerator unless they are being used for analysis. The laboratory is responsible for sample storage and security so that:

- Samples and extracts are stored for 60 days after the final analytical data report has been submitted. The samples, extracts, and digestates are then disposed by the laboratory in accordance with laboratory standard operating procedures (SOPs) and applicable regulations.
- Samples are not stored with standards or sample extracts.

## **3.5 Sample Containers and Preservatives**

Table 1 identifies the sample preparation and analytical method, matrix, holding time, containers, and preservatives for the chemical analyses to be performed as part of this work. Sample bottle requirements and preservation are discussed in more detail below.

### **3.5.1 Sample Containers**

Sample bottles will be provided by the analytical laboratory and will conform to the requirements of the United States Environmental Protection Agency (USEPA) Specifications and Guidance for Contaminant-Free Sample Containers. Aqueous samples for analysis of VOCs will be collected in 40-mL vials with Teflon septa.

### **3.5.2 Sample Preservation**

Samples will be preserved as summarized on Table 1. When chemical preservation is required, preservatives will be added to the sample bottles by the laboratory prior to sample collection. Sample preservation is checked by the laboratory upon sample receipt. If it appears that the level of preservation is not adequate, laboratory preservation preparation and addition will be modified.

## 4 DATA QUALITY OBJECTIVES AND CRITERIA

DQOs are statements, expressed in either qualitative or quantitative terms, which address the appropriate level of data quality for a project. The quality of data generated must be suitable to support the decisions used to achieve the overall goals as delineated in the *Remedial Design*. The general project DQOs are summarized in this section, with detailed information given throughout this QAPP and associated sections of the remedial design. The overall DQOs of the project are:

- To ensure that samples collected are representative of the sample population;
- To provide detection limits for the selected analytical methods, which are below the established cleanup objectives or regulatory limits;
- To measure and document precision and accuracy using procedures established by the laboratories, the New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP) and U.S. Environmental Protection Agency (EPA) approved analytical methods; and
- To ensure that a NYSDOH ELAP and NYSDOH ELAP CLP certified laboratory will conduct all soil/residues and wastewater analyses.

### 4.1 Laboratory Selection

The laboratory chosen for the project will be certified, and maintain certification, under the NYSDOH ELAP and the NYSDOH ELAP CLP for analyses of solid and hazardous waste. Only analytical laboratories that have experience in MGP projects or similar projects will be considered for use.

### 4.2 Data Quality Criteria

Quality control (QC) procedures are employed during chemical analysis to support and document the attainment of established method quality objectives. Whether these QC procedures support an assessment of general batch control or matrix-specific application, documentation includes calculating Data Quality Indicators (DQIs) to verify data usability and contract compliance. DQIs were formerly referred to as the parameters of precision, accuracy, representativeness, comparability, completeness, and sensitivity (PARCCS). Acceptance criteria for PARCCS are developed during project-specific scoping sessions during the DQO development process. The basis for assessing each of these elements of data quality is discussed in the following subsections.

#### 4.2.1 Precision

Precision is the degree to which a set of observations or measurements of the same property, obtained under similar conditions, conform to themselves. Precision is usually expressed as standard deviation, variance, percent difference, or range, in either absolute or relative terms. Precision data indicate how consistent and reproducible the field sampling or analytical procedures have been. Field duplicate precision is evaluated by calculating a RPD using the following equation:

$$RPD = |(D1-D2)/(1/2(D1+D2))| \times 100$$

Where:

D1 = original sample concentration  
D2 = duplicate sample concentration

If more than two field duplicate samples are collected from adjacent locations and analyzed, they are referred to as co-located field replicates. If two or more aliquots of the same sample are prepared and

analyzed by the laboratory, these are referred to as laboratory replicates. Precision of replicate samples is evaluated by calculating the RSD using the following equation:

$$\%RSD = \frac{\sqrt{\frac{\sum_{i=1}^{i=n} |D_i - \bar{D}|^2}{n}}}{\bar{D}}$$

Where:

$D_i$  = the individual sample concentrations  
 $\bar{D}$  = the mean of n values  
n = the total number of values

Possible causes of poor precision include sample heterogeneity, improper sample collection or handling, inconsistent sample preparation, and poor instrument stability.

#### 4.2.2 Accuracy

Accuracy is the degree of agreement of a measurement, or average of measurements, with an accepted reference or "true" value, and is a measure of bias in the system. Accuracy of measurement data will be assessed and controlled through the use of lab control samples (LCSs) and lab control sample duplicates (LCSDs), surrogate spikes, and site-specific matrix spike (MSs) and matrix spike duplicates (MSDs).

Results for LCS and surrogate spikes will be the primary indicators of accuracy. These results will be used to control accuracy within acceptable limits for definitive-level data. Field-designated MS/MSD samples will be employed for applicable methods to identify matrix-associated analytical influences or interferences that may affect the accuracy of the analytical data. As spiked samples are analyzed, spike recoveries will be calculated and compared to pre-established acceptance limits.

Accuracy/bias is:

$$MS \% \text{ recovery} = \frac{\text{concentration of sample plus spike} - \text{concentration of unspiked sample}}{\text{value of spike added}} \times 100$$

$$LCS \text{ target/surrogate } \% \text{ recovery} = \frac{\text{measured concentration}}{\text{true (expected) concentration}} \times 100$$

Triplicate blanks, field blanks, and equipment blanks monitor accuracy/bias by detecting any concentrations of analytes in water that was originally contaminant-free and comparing that to the field sample results.

#### 4.2.3 Completeness

Completeness is a measure of the amount of adequate data obtained from the actual performance of measurement procedures compared to the amount expected to be obtained from error-free performance of the same measurement procedures under normal conditions. Completeness measures the extent to which the database resulting from a measurement effort fulfills objectives for the amount of data required. Completeness is defined as the valid data percentage of the total tests requested.

$$\text{Completeness (\%)} = \frac{\text{number of valid analyses per analyte in a matrix}}{\text{number of requested analyses per analyte for that matrix}} \times 100$$

Complete project data involves both satisfactory performance and documentation of field and laboratory procedures. Valid analyses are defined as those where the sample arrives at the laboratory intact, properly preserved, in sufficient quantity to perform the requested analyses, and accompanied by a completed chain-of-custody. Furthermore, the sample must be analyzed within the specified holding time and in such a manner that analytical QC acceptance criteria are met, with the following exception. Data qualified as estimated as a result of data validation are considered valid and counted towards completeness if still usable for the intended use of the data. Such data require evaluation to determine suitability for decision-making purposes. Rejected data are not valid data. Completeness for the entire project also involves completeness of field and laboratory documentation, whether all samples and analyses specified in the project-specific QAPP have been processed, and whether the procedures specified in the applicable laboratory SOPs have been followed.

The completeness goal for a project as a whole is 90 percent. The completeness goal is for the entire duration of the project (e.g., there is not a goal of 90 percent completeness per sampling round). The completeness goal for the analytical laboratory portion for each project is 95 percent. Site-specific completeness goals may be necessary to support various environmental cleanup or No Further Action decisions. Failure to achieve the project completeness goal may necessitate re-sampling and reanalysis, or re-evaluation of DQOs.

Critical samples are samples that are used as the sole or primary source for making environmental decisions. These samples require a high level of data quality and completeness. Critical samples will have a completeness goal of 100 percent for each analyte of concern in each matrix, and the completeness goal will be evaluated based on each sampling round. Should recollection efforts be necessary to attain completeness objectives, appropriate Project Managers and regulatory parties will assess budgetary, site access, schedule, or other constraints, and their impact to the decision-making process.

#### **4.2.4 Representativeness**

Representativeness expresses the degree to which data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition.

The characteristics of representativeness are usually not quantifiable. Subjective factors to be considered in evaluating how representative a set of measurement data is of a property being measured include:

- Degree of homogeneity of the property or environmental matrices across a site;
- Consistency in applying field procedures;
- Degree of homogeneity of the property within a sample collected from one location at a site; and
- Available information on which a sampling plan is based.

To maximize representativeness of the data, sampling techniques, sample size, and sample locations are carefully chosen to yield samples representative of the particular location and time of sampling, and to produce samples that are collectively representative of the site as a whole.

#### **4.2.5 Comparability**

Comparability is the degree to which one data set can be compared to another data set measuring the same property. Comparability is assured through the use of established and approved sample collection techniques and analytical methods, consistency in the basis of analysis (volume, etc.), consistency in reporting units, and analysis of standard reference materials.

Data comparability will be achieved by using standard units of measure, e.g., milligrams per liter (mg/L) for metals and other inorganics in water samples and micrograms per liter (µg/L) for organics in water. The use of approved or standard methods to collect and analyze samples (in this case American Society of Testing Materials and USEPA Methods), along with instruments calibrated against National Institute for Standards and Technology traceable standards will also help maintain comparability.

Comparability also depends on the other data quality characteristics. Only when data are judged to be representative of the environmental conditions, and when precision and accuracy are known, may data sets be compared with confidence.

#### **4.2.6 Sensitivity**

Sensitivity is the ability of an analytical method or instrument to discriminate between measurement responses representing different concentrations. This capability is established during the planning phase to meet project-specific objectives. It is important to be able to detect the target analytes at the levels of interest. Sensitivity requirements include the establishment of various limits such as calibration requirements, instrument detection limits (IDLs), limits of detection (LODs), limits of quantitation (LOQs), and project quantitation limits. The IDLs, LODs, and LOQs are based on an interference-free matrix (i.e., reagent water), which do not take into account matrix effects and may not be achievable for all environmental samples.

Once the laboratory that will be providing analytical services is contracted, it will be confirmed that the lab will be able to meet the sensitivity required to meet the sampling objectives. In particular, the following LOQs will be required:

- The LOQs for the soil waste characterization sampling will be required to meet the regulatory TCLP limits as well as any requirements of the contracted waste disposal facility.
- The LOQs for soil samples for reuse on-site or imported fill material will be required to meet the NYSDEC Unrestricted Use Allowable Constituent Levels for Imported Fill or Soil as reported in DER-10, Appendix 5.
- The LOQs for characterization of wastewater will be required to meet the limits of the contracted waste facility or the facility responsible for approving and accepting the waste once determined.

#### **4.2.7 Application of Data Qualifiers**

If corrective actions are not performed or are not effective, the laboratory will apply an initial appropriate flag to the sample result to advise the data user of the uncertainty in the result. The data validator will apply the final qualifier based on consideration of all data and project objectives.

### **4.3 Field Quality Control**

#### **4.3.1 Field Duplicate Samples**

Field duplicate samples are used to assess the variability of a matrix at a specific sampling point and to assess the reproducibility of the sampling method. Each duplicate sample will be analyzed for the same parameters as the original sample collected that day.

Soil duplicate samples are collected from a single location and device (e.g., soil trowel). Soil duplicates for VOC analysis are collected first, without homogenization. If other parameters are being analyzed, the remaining soil is homogenized (e.g., by mixing in a clean stainless steel bowl) and prior to generating the sample and duplicate.

The default field duplicate precision (RPD) objective is  $\leq 50\%$  percent RPD for all matrices where the sample concentration is at least two times the reporting limit. Where the analyte is detected in both samples but the concentration is less than 2 times the reporting limit, precision is assessed by the absolute difference, which should be less than the reporting limit. The RPD is not calculable when the analyte is not detected in one or both analyses. A more detailed discussion of the calculation is provided in Section 4.2.1 (Precision), above.

Field duplicates will be collected for soil samples from soil to remain on site (either reused excavated soil or imported fill) at a frequency of one per 20 samples or one per day of sample collection. Field duplicates will not be collected for the waste characterization samples unless required by the waste handling facility.

#### **4.4 Laboratory Quality Control**

Each laboratory will be NYSDOH Certified for the analyses they will perform. Each analyst must complete a start-up proficiency procedure to demonstrate their capability to perform accurate and precise analyses on each type of instrument they operate. In addition, each laboratory must accurately analyze samples provided by the NYSDOH on a semi-annual basis to maintain certification. The laboratories have internal quality control officers that review all methodologies and implement corrective action, including reanalyzing samples, which do not pass established laboratory quality control criteria.

Laboratory quality control procedures are specified in the analytical methods. These specifications include the type of laboratory quality control check required, compounds and concentrations to be used, and laboratory quality control acceptance criteria.

Laboratory quality control checks will include (where specified by method):

- Calibration Standards
- Methods Blanks
- Duplicates
- Surrogate Spikes
- Internal Standards
- Laboratory Duplicates
- Calibration Check Standards
- Laboratory Control Samples

## **5 CALIBRATION PROCEDURES**

Each analysis will be performed in accordance with NYSDOH ELAP sanctioned methods or equivalent U.S. EPA analytical procedures. Each procedure specifies the method of frequency of calibration necessary to perform accurate and precise analyses. Each analytical instrument verifies the Minimum Detection Limit at least every six months as prescribed by the NYSDOH ELAP. The calibration of the instruments is verified at the beginning and end of each auto sampler run.

## **6 DATA REVIEW, VALIDATION, AND REPORTING**

### **6.1 Laboratory Data Collection**

A significant portion of the analyses performed requires the use of automated laboratory instrumentation. Raw data collected from the instruments detectors will be converted to standard units of mg/kg (or µg/kg) for solid matrices and mg/L (or µg/L) for water. All raw data will be stored in electronic form and in laboratory notebooks in case the analysis needs to be recreated. Raw data for all analyses will be archived for a minimum of four years.

### **6.2 Data Review**

All analytical data will be verified for precision and accuracy utilizing the laboratory's in-house Quality Assurance/Quality Control programs. In addition, all data packages will be reviewed by NYSEG project personnel to insure that all data deliverables have been properly provided.

### **6.3 Full Data Validation**

The full third party data validation process consists of a formal systematic review of analytical results and quality control documentation with regards to the parameters analyzed for the imported fill and/or excavated soil to be reused on site. The samples for waste characterization will not undergo data validation. On the basis of this review, a third party data validator will make judgments and express concerns on the quality and limitations of the specific data and the validity of the data package as a whole. The data validator will prepare documentation of his or her review using the standard USEPA Inorganics Regional Assessment and Organics Regional Assessment forms to summarize deficiencies and general laboratory performance. These forms are accompanied by appropriate supplementary documentation, which identifies specific problems.

### **6.4 Reporting**

Final reports for analytical data will be reviewed and accepted by NYSEG prior to submission to the NYSDEC. Reports for analyses performed under the ELAP protocol will contain results sheets for the sample analyzed. These reports must include at a minimum:

- NYSEG Sample ID number;
- Laboratory sample ID number;
- Sample collection date;
- Extraction or digestion date (if applicable);
- Date Analyzed;
- Analytical method;
- Analytical results (with units clearly identified);
- Results of laboratory blank and field blanks;
- Results of spikes, matrix spikes, and duplicates;
- Surrogate recoveries (if applicable);
- Complete Chain-of-custody forms; and
- Field log sheets (if available)

For the waste characterization samples, Category A data packages will be sufficient. For any samples undergoing data validation (imported soil or reused soil) will require the submittal of full Category B packages.



## **7 PREVENTATIVE MAINTENANCE**

### **7.1 Field Instruments and Equipment**

Equipment instruments, tools, gauges, and other items requiring preventative maintenance will be serviced in accordance with the manufacturer's specified recommendations or written procedures developed by the operators. All field equipment service will be conducted by qualified personnel. Prior to any field sampling, each piece of field equipment will be inspected to ensure that it is operational. If the equipment is not operational, it must be repaired prior to use. All equipment which required charging or batteries will be fully charged or have fresh batteries at the start of the project. An equipment repair/maintenance log will be kept for each field instrument. Any non-operational/non-repairable field equipment will be replaced.

### **7.2 Laboratory Instruments and Equipment**

Each laboratory has an instrument/equipment maintenance program, which includes procedures for daily, weekly, monthly, or annual routine maintenance. In addition, maintenance is performed if the accuracy and/or precision of the instrument are in question.

#### **7.2.1 Instrument Maintenance**

Preventative maintenance of laboratory instruments will be conducted in accordance with the manufacturer's guidelines or written procedures developed by the operators. All instrument service will be performed by qualified personnel. To minimize potential downtime, the laboratory will maintain a sufficient supply of critical spare parts for its instruments and, where practical, maintain a service contract for rapid instrument repair. Wherever possible, the laboratory will retain backup instrumentation. An instrument repair/maintenance log will be maintained for each instrument.

#### **7.2.2 Equipment Monitoring**

On a daily basis, the operation of the laboratory equipment (i.e., balances, ovens, refrigerators, water purification systems, etc.) will be checked and documented. Any discrepancies will be immediately reported to the appropriate laboratory personnel for resolution.

## Tables

**Table 1**  
**Quality Assurance Project Plan**  
**Sample Bottle, Volume, Preservation, and Holding Time Summary**

MATRIX/ANALYSIS	Analytical Method	Typical Sample Bottles				Preservation (1)	Holding Time in Days (2)	
		Mat'l	Size	Qty	Source		Extraction	After Extraction
Soil Waste Characterization Samples								
TCLP Volatile Organics	SW 846 1311/8260	G	20 mL	1	Lab	4 ° C	NA	14
TCLP Semivolatile Organics	SW 846 1311/8270	G	500 mL	1	Lab	4 ° C	5	40
TCLP Pesticides/Herbicides	SW 846 1311/8080/8151	G	500 mL	1	Lab	4 ° C	5	40
TCLP Metals (excluding mercury)	SW 846/1311/6010B	G	500 mL	1	Lab	4 ° C	NA	180
TCLP mercury	SW 846 1311/7471A	G	500 mL	1	Lab	4 ° C	5	28
PCBs	SW 846 8082	G	500 mL	1	Lab	4 ° C	5	40
Reactive Sulfide	SW 846 Chapter 7.3.3.2	G	500 mL	1	Lab	4 ° C	NA	7
Reactive Cyanide	SW 846 Chapter 7.3.3.2	G	500 mL	1	Lab	4 ° C	NA	14
Ignitability	SW 846 Method 1030	G	500 mL	1	Lab	4 ° C	NA	NA
Paint Filter	SW 846 Method 9095B	G	500 mL	1	Lab	4 ° C	NA	NA
Corrosivity	SW 846 Section 7	G	500 mL	1	Lab	4 ° C	NA	2
Percent Solids		G	500 mL	1	Lab	4 ° C	NA	NA
Samples for Imported Fill or Soil Reuse								
Volatile Organics	SW846 8260C	G	8 oz	1	Lab	4 ° C	NA	14 days
Semivolatile Organics	SW 846 8270C	G	8 oz	1	Lab	4 ° C	14 days	40 days
Pesticides/Herbicides	SW846 8080/8151	G	8 oz	1	Lab	4 ° C	14 days	40 days
PCBs	SW 846 8082	G	8 oz	1	Lab	4 ° C	14 days	40 days
Total Cyanide	SW 846 9012B	G	8 oz	1	Lab	4 ° C	NA	14 days
Hexavalent Chromium	SW 846 7196A	G	8 oz	1	Lab	4 ° C	30 days	24 hours
Metals (except mercury)	SW 846 6010B	G	8 oz	1	Lab	4 ° C	NA	180 days
Mercury	SW 846 7471A	G	8 oz	1	Lab	4 ° C	NA	28 days
Wastewater Sampling								
Volatile Organics	SW846 8260C	G	40-mL	2 or 3	Lab	HCl to pH>12	NA	14 days
Semivolatile Organics	SW 846 8270C	G	1,000 mL amber	1	Lab	4 ° C	5 days	40 days
Metals (except mercury)	SW 846 6010B	P	500 mL	1	Lab	HNO <sub>3</sub> to pH<2	NA	180 days
Mercury	SW 846 7471A	P	500 mL	1	Lab	HNO <sub>3</sub> to pH<2	NA	28 days
Total Cyanide	SW 846 9012B	P	500 mL	1	Lab	NaOH to pH>12	NA	14 days
Reactivity	SW 846 Section 7	G	500 ml	1	Lab	4 ° C	NA	14 days for cyanide/7 days for sulfide
Corrosivity	SW 846 Section 7	G	500 mL	1	Lab	4 ° C	Analyze Immediately	

(1) All samples for chemical analysis should be held at 4 degrees C in addition to any chemical preservation required.

(2) Holding time calculated from day of collection, unless noted as being from time of extraction. Laboratory holding times (ASP 2005, Exhibit I) are two days shorter to allow for field handling and shipping.

G = Glass

P = Plastic

SS = Stainless Steel

SW-846: Test Methods for Evaluating Solid Waste, Physical/Chemical Methods. USEPA SW-846. Complete through Update IV, March 2009.

EPA = Compendium of Methods for the Determination of Toxic Organics in Air, Second Edition (EPA/625/R-96/010b; 1999)

**Table 2**  
**Quality Assurance Project Plan**  
**QA/QC Sample Summary**

MATRIX/ANALYSIS	Analytical Method	Laboratory	Field Sample Quantity	Field Duplicate	Equipment Blank <sup>1</sup>
<b>Soil Waste Characterization Samples</b>					
TCLP Volatile Organics	SW 846 1311/8260	TBD	TBD	0	0
TCLP Semivolatile Organics	SW 846 1311/8270	TBD	TBD	0	0
TCLP Pesticides/Herbicides	SW 846 1311/8080/8151	TBD	TBD	0	0
TCLP Metals (excluding mercury)	SW 846/1311/6010B	TBD	TBD	0	0
TCLP mercury	SW 846 1311/7471A	TBD	TBD	0	0
PCBs	SW 846 8082	TBD	TBD	0	0
Reactive Sulfide	SW 846 Chapter 7.3.3.2	TBD	TBD	0	0
Reactive Cyanide	SW 846 Chapter 7.3.3.2	TBD	TBD	0	0
Ignitability	SW 846 Method 1030	TBD	TBD	0	0
Paint Filter	SW 846 Method 9095B	TBD	TBD	0	0
Corrosivity	SW 846 Section 7	TBD	TBD	0	0
Percent Solids		TBD	TBD	0	0
<b>Samples for Imported Fill or Soil Reuse</b>					
Volatile Organics	SW846 8260C	TBD	TBD	1 per 20 or sampling event	0
Semivolatile Organics	SW 846 8270C	TBD	TBD	1 per 20 or sampling event	0
Pesticides/Herbicides	SW846 8080/8151	TBD	TBD	1 per 20 or sampling event	0
PCBs	SW 846 8082	TBD	TBD	1 per 20 or sampling event	0
Total Cyanide	SW 846 9012B	TBD	TBD	1 per 20 or sampling event	0
Hexavalent Chromium	SW 846 7196A	TBD	TBD	1 per 20 or sampling event	0
Metals (except mercury)	SW 846 6010B	TBD	TBD	1 per 20 or sampling event	0
Mercury	SW 846 7471A	TBD	TBD	1 per 20 or sampling event	0
<b>Wastewater Sampling</b>					
Volatile Organics	SW846 8260C	TBD	TBD	0	0
Semivolatile Organics	SW 846 8270C	TBD	TBD	0	0
Metals (except mercury)	SW 846 6010B	TBD	TBD	0	0
Mercury	SW 846 7471A	TBD	TBD	0	0
Total Cyanide	SW 846 9012B	TBD	TBD	0	0
Reactivity	SW 846 Section 7	TBD	TBD	0	0
Corrosivity	SW 846 Section 7	TBD	TBD	0	0

Notes

1 Field equipment rinsate blank quantity will vary depending on sample collection rate and types of sampling equipment used. It is anticipated that only disposable sampling equipment will be used. In this event, no equipment blanks will be collected.

## **Attachments**

**Attachment A**

**Sample Chain of Custody Form**

## TAL-4124 (1007)

Client

Drinking Water? Yes ☐ No ☐

THE LEADER IN ENVIRONMENTAL TESTING

**DISTRIBUTION:** WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy

**Attachment B**

**Sample Identification Naming Convention**



# SAMPLE IDENTIFICATION

## NAMING CONVENTION FOR SOIL AND WATER SAMPLES

### SYSTEM CODING

First & Second = Site	Norwich Birsdall Site	NB
Third & Fourth = Source	Excavation	EX
	Stockpile	SP
	Frac Tank	FT
	Poly Container	PC
	Metal Barrel	MB
	Roll Off Container	RO
	Waste Wrangler	WW
	Test Pit	TP
	Boring	BO
	Geoprobe	GP
Fifth & Sixth = Location	Sidewall Sample	SW
	Bottom Sample	BM
	Waste Soil	WS
	Wastewater	WW
	Debris	DB
Seventh & Eighth = Relative Depth	Surface Soil	00
	Depth below Ground	02
	Non-Applicable	NA
Ninth, Tenth & Eleventh =	Sample Number	005

EXAMPLE: Norwich Birsdall Site; Excavation; Sidewall; 2 ft below ground; and sample number

**SAMPLE IDENTIFICATION: NBEXSW02005**

<b>FORMER MANUFACTURED GAS PLANT SITE OR FORMER MANUFACTURED GAS PLANT SITE DISPOSAL AREA</b>	
Site	Code
Albion Ingersoll Street	AI
Auburn Clark Street	AC
Auburn Green Street	AG
Auburn McMaster Street	AM
Binghamton Court Street	BC
Binghamton – Johnson City	BJ
Binghamton Washington Street	BW
Clyde Lock Street	CL
Corning Chestnut Street	CC
Cortland/Homer South Main Street	CH
Dansville Ossian Street	DO
Elmira Madison Avenue	EM
Elmira Water Street	EW
Geneva Border City	GB
Geneva Wadsworth Street	GW
Goshen West Main Street	GS
Granville North Street	GR
Ithaca Cayuga Inlet	II
Ithaca Court Street	IC
Ithaca First Street	IF
Lockport State Road	LS
Lockport Transit Street	LT
Lyons Water Street	LW
Mechanicville Central Avenue	MC
Mechanicville Coons Crossing	ME
Mechanicville Willow Glen MGP Disposal Site	MW
Newark Water Street	NW
<b>Norwich Birdsall Street</b>	<b>NB</b>
Oneonta James Georgeson Avenue (Gas Ave.)	OG
Owego East Main Street	OE
Palmyra Park Drive	PP
Penn Yan Jackson Street	PJ
Penn Yan Water Street	PW
Plattsburgh Bridge Street	PB
Plattsburgh Saranac Street	PS
Seneca Falls Fall Street	SF
Warsaw Court Street	WC
Waterloo East Main Street	WE
Waterloo Babbott Street	WB

## **Appendix D**

### **Transportation of Solid and/or Liquid Waste**



# Final Phase 1 Remedial Design Report Transportation Plan

**Site:**

Norwich Former Manufactured Gas Plant Off-site Target Area  
Front Street  
Norwich, Chenango County, New York

**Submitted to:**

New York State Department of Environmental Conservation  
Department of Environmental Remediation  
625 Broadway  
Albany, NY 12233-7012

**Prepared for:**

New York State Electric & Gas Company  
James A. Carrigg Center, 18 Link Drive  
P.O. Box 5224  
Binghamton, New York 13902-5224

**Prepared by:**

AECOM  
40 British American Blvd.  
Latham, New York 12110

July 2016

AECOM Project No. 60345362.1



# Final Phase 1 Remedial Design Report Transportation Plan

**Site:**

Norwich Former Manufactured Gas Plant  
Off-site Target Area  
Front Street  
Norwich, Chenango County, New York

Author: Scott T. McDonough

Title: Environmental Engineer

**Submitted to:**

NYSDEC  
Department of Environmental Remediation  
625 Broadway  
Albany, NY 12233-7012

Date: 7/11/2016

Reviewer: Scott Underhill, P.E.

**Prepared for:**

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James A. Carrigg Center, 18 Link Drive  
P.O. Box 5224  
Binghamton, New York 13902-5224

Title: Project Manager

Date: 7/11/2016

**Prepared by:**

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*July 2016*

AECOM Project No. 60345362.1

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3.0	GENERAL WORK CONDITIONS .....	3
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## **1.0 SCOPE OF WORK**

This Specification is for the transportation of solid or liquid non-hazardous and hazardous waste associated with the Norwich former manufactured gas plant (MGP) off-site target area in the City of Norwich, Chenango, New York. All transportation must be in accordance with the Order on Consent, Index Number D0-0002-9309, with New York State Department of Environmental Conservation (NYSDEC) Regulations, and any other applicable Federal, State, and Local Laws.

## **2.0 WORK BY TRANSPORTATION CONTRACTOR**

The transportation contractor shall provide all necessary supervision, training, permits, hazardous waste manifest (when required), labor, personal protective equipment (PPE), tools, equipment, consumable materials, and expendable materials, to transport solid or liquid waste to a disposal facility as detailed herein.



### 3.0 GENERAL WORK CONDITIONS

- 3.1 The transporter shall comply with all applicable provisions of the NYSDEC Regulation, 6 NYCRR Part 364 “Waste Transporters Permit”, Title 6 of the Official Compilation of codes, Rules and Regulations.
- 3.2 The transporter shall comply with all applicable provisions of the NYSDEC Regulation, 6 NYCRR Part 372 “Hazardous Waste Manifest System and Related Standards of Generators, Transporters and Facilities”, Title 6 of the Official Compilation of codes, Rules and Regulations.
- 3.3 The transporter shall comply with all applicable provisions of New York State Department of Transportation (NYSDOT), the New York State Department of Motor Vehicle (NYSDMV), and/or any other applicable federal, state, and local laws.
- 3.4 The transporter shall comply with all applicable provisions of Occupational Safety and Health Act or Administration (OSHA) 29 CFR 1910.120 “Hazardous Waste Operations Health & Emergency Response”.
- 3.5 The transporter shall develop and implement a written Health & Safety Plan for their drivers that address potential exposure to MGP site residuals.
- 3.6 The transporter shall adhere to the following rules while working on a MGP site project and waste disposal facility:
  - 3.6.1 Any truck found unacceptable by the NYSEG project coordinator or the contractor health & safety officer will be rejected. Any cost for rejected trucks shall be born by the transporter. If the NYSDEC project oversight finds any truck unacceptable, they should bring it to the attention of the NYSEG project coordinator.
  - 3.6.2 The truck drivers will report their arrival to the NYSEG project coordinator.
  - 3.6.3 Truck drivers are generally restricted to their trucks and the designated waiting areas. Drivers are not permitted access to the MGP site project without express permission from the NYSEG project coordinator.
  - 3.6.4 Truck drivers will don **HARD HATS, SAFETY GLASSES, and STEEL TOE BOOTS**, as a minimum for personal protection.
  - 3.6.5 The drivers of all trucks and roll off containers transporting hazardous solid waste or conditionally exempt MGP site remediation waste will line the entire box (to top of side boards) with 6-mil thick polyethylene sheeting. Trucks transporting non-hazardous waste may be lined as previously stated. All trucks will have a watertight tailgate that has a gasket between the box and tailgate or driver will apply caulking between the box and the tailgate.
  - 3.6.6 All trucks require working audible and visual backup signals.
  - 3.6.7 When loading or when directed by the NYSEG project coordinator, the truck engine should be shut off. Trucks may be restarted and driven away only after the “all clear” direction from the loading operator or a site representative.

- 3.6.8 In residential or other areas where the exhaust and/or noise could be a nuisance, or if the truck is left idle for 5 minutes or more, the truck engine should be shut off.
- 3.6.9 No truck will be loaded above the sideboards and no waste will be spilling out of the truck. Before trucks leave the loading areas the truck exterior and tires will be cleaned (by site workers) of waste.
- 3.6.10 NYSEG remedial workers will reposition the cover bars over the waste material. **DRIVERS WILL NOT WALK OVER WASTE MATERIAL.**
- 3.6.11 Drivers will cover loads before leaving the loading area with a solid fabric (i.e., vinyl, reinforced polyethylene) cover that covers the entire load.
- 3.6.12 Obey traffic signs and notices (obey the posted speed limit).
- 3.6.13 Obey rules posted on the site and/or any site-specific *Health & Safety Plan* for all project personnel.
- 3.6.14 Report any accidents to the NYSEG project coordinator and cooperate with any subsequent accident investigation.
- 3.6.15 No children under 16 years of age are allowed on MGP site projects.
- 3.6.16 No passengers are allowed in the Contamination Reduction Zone (loading area).
- 3.6.17 Slow down and be extra cautious during times of poor weather (i.e., rain, fog, snow).
- 3.6.18 Take extra care around blind corners (watch for pedestrians and construction equipment).
- 3.6.19 Eating, and/or drinking is not permitted. Eating, and/or drinking are permitted in designate areas of the Support Zone.
- 3.6.20 Smoking is not allowed on NYSEG Properties.
- 3.6.21 After disposal of waste, the transporter is responsible for properly decontaminating their truck or trailer, trailer or tanker, and roll off containers.

#### 4.0 TRUCK ROUTE

The truck route for arrival and departure at the Norwich former MGP site truck gates on Front Street will be as follows:

- **Arrival:** From US Route 12 (south); turn left (east) on East Main Street; turn right (south) onto Birdsell Street; turn right (west) onto Front Street; enter site from Truck Gates on Front Street.
- **Departure from Site:** Exit the site by the Truck Gate; turn east onto Front Street; turn left (north) onto Birdsell Street; proceed north to intersection with East Main Street; turn left (west) onto East Main Street; proceed to US Route 12.
- **Arrival to Site from Service Center:** Exit the service center by the Truck Gate; turn right (south) onto County Route 32; proceed south on County Route 32 to intersection with County Route 32A; turn right (west) onto County Route 32A; turn right (north) onto Birdsell Street; turn right (west) onto Front Street; enter site from Truck Gates on Front Street.
- **Departure from Site to Service Center:** Exit the site by the Truck Gate; turn east onto Front Street; turn right (south) onto Birdsell Street; proceed south to intersection with County Route 32A; turn left (east) onto County Route 32A; turn left (north) onto County Route 32; enter service center from Truck Gate on County Route 32.

The truck route for arrival and departure at the Norwich former MGP site truck gate on Brown Avenue will be as follows:

- **Arrival:** From US Route 12 (south); turn left (east) on East Main Street; turn right (south) onto Birdsell Street; turn right (west) onto Brown Avenue; enter site from Truck Gate on Brown Avenue.
- **Departure from Site:** Exit the site by the Truck Gate; turn left (east) onto Brown Avenue; turn left (north) onto Birdsell Street; proceed north to intersection with East Main Street; turn left (west) onto East Main Street; proceed to US Route 12.
- **Arrival to Site from Service Center:** Exit the service center by the Truck Gate; turn right (south) onto County Route 32; proceed south on County Route 32 to intersection with County Route 32A; turn right (west) onto County Route 32A; turn right (north) onto Birdsell Street; turn right (west) onto Brown Avenue; enter site from Truck Gate on Brown Avenue.
- **Departure from Site to Service Center:** Exit the site by the Truck Gate; turn left (east) onto Brown Avenue; turn right (south) onto Birdsell Street; proceed south to intersection with County Route 32A; turn left (east) onto County Route 32A; turn left (north) onto County Route 32; enter service center from Truck Gate on County Route 32.

## **Appendix E**

### **Construction Quality Assurance Plan**



# Final Phase 1 Remedial Design Report Construction Quality Assurance Plan

**Site:**

Norwich Former Manufactured Gas Plant Off-site Target Area  
Front Street  
Norwich, Chenango County, New York

**Submitted to:**

New York State Department of Environmental Conservation  
Department of Environmental Remediation  
625 Broadway  
Albany, NY 12233-7012

**Prepared for:**

New York State Electric & Gas Company  
James A. Carrigg Center, 18 Link Drive  
P.O. Box 5224  
Binghamton, New York 13902-5224

**Prepared by:**

AECOM  
40 British American Blvd.  
Latham, New York 12110

July 2016

AECOM Project No. 60345362.1



# Final Phase 1 Remedial Design Report Construction Quality Assurance Plan

**Site:**

Norwich Former Manufactured Gas Plant  
Off-site Target Area  
Front Street  
Norwich, Chenango County, New York

Author: Scott T. McDonough

Title: Environmental Engineer

**Submitted to:**

NYSDEC  
Department of Environmental Remediation  
625 Broadway  
Albany, NY 12233-7012

Date: 7/11/2016

Reviewer: Scott Underhill, P.E.

**Prepared for:**

New York State Electric & Gas Company  
James A. Carrigg Center, 18 Link Drive  
P.O. Box 5224  
Binghamton, New York 13902-5224

Title: Project Manager

Date: 7/11/2016

**Prepared by:**

AECOM  
40 British American Blvd.  
Latham, New York 12110

December 2015

AECOM Project No. 60345362.1

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## **1.0 INTRODUCTION**

This *Construction Quality Assurance Plan (CQAP)* is designed to assure the quality of the project by monitoring, inspecting, and testing the processes and materials associated with the remediation to be completed at New York State Electric and Gas Corporation's (NYSEG's) Norwich Former Manufacturing Gas Plant (MGP) Off-site Target Area, City of Norwich, Chenango County, New York. This CQAP supplements the Work Plan.



## 2.0 CONSTRUCTION QUALITY ASSURANCE PLAN OBJECTIVES

The objective of this *CQAP* is to identify and standardize measures to provide confidence that activities in all phases of the project will be completed in accordance with the *Remedial Action Design*; applicable local, state, and federal regulations; and appropriate industry standards. The CQAP will be implemented through inspection; sampling; testing; and review of services, workmanship, and materials. Specific objectives of this plan establish protocols and procedures for the following components:

1. Responsibility and Authority - The responsibility and authority of the key personnel involved in the completion of the project.
2. Inspection and Testing Activities - Establish the observations and implement inspections and tests that will be used to ensure that the construction activities for the project meet or exceed all design criteria, (i.e., Work Plan, and local, state, and federal regulations).
3. Sampling Strategies - Establish responsibility for sampling activities and methods including frequency and acceptance criteria for ensuring that sampling meets criteria in the Work Plan, local, state, and federal regulations.
4. Documentation and Reporting - Establish appropriate field documents (i.e. In-Situ Solidification/Stabilization [ISS] mix reports, photographic log, sampling log, and variances to the Work Plan).

### **3.0 RESPONSIBILITY AND AUTHORITY**

Responsibilities of each member of the construction project team are described below.

#### **3.1 Contractor (To Be Determined)**

The contractor is responsible for coordinating field operations for the remediation; including coordination of subcontractors, to comply with the requirements of the *Remedial Action Design* and permitting agencies. The Contractor is responsible for completing and submitting documentation required by the CQAP and also has the authority to accept or reject the materials and workmanship of any subcontractors at the site.

The contractor is also responsible to ensure a functional construction quality control organization is active during the project and provide support for the construction quality control system to perform inspections, tests, and retesting in the event of failure of any item of work, including that of the subcontractors, and to assure compliance with the contract provisions. The construction quality control system includes, but is not limited to the inspections and tests required in the technical provisions of the *Remedial Action Design* and will cover all project operations.

#### **3.2 Construction Quality Assurance Officer Tracy Blazicek NYSEG Remediation Manager**

The responsibility of the construction quality assurance officer is to perform those activities in this CQAP deemed necessary to assure the quality of construction and support quality control efforts. The construction quality assurance officer will be on site as required during construction activities. The responsibility of the construction quality assurance officer is to ensure the quality of construction meets or exceeds that defined by the *Remedial Action Design* and identified in the *Quality Assurance Project Plan* (QAPP). Specific responsibilities of the construction quality assurance officer include:

- Directing and supporting the construction quality control representative inspection personnel in performing observations and tests by verifying that the data are properly recorded, validated, reduced, summarized, and inspected.
- Evaluating the construction activities and the construction quality control representative's efforts.
- Evaluating sampling activities and efforts of the sampling quality assurance officer.
- Educating construction quality control inspection personnel on construction quality control requirements and procedures.
- Scheduling and coordinating construction quality assurance inspection activities.

#### **3.3 Sampling Quality Assurance Officer TBD**

The responsibility of the sampling quality assurance officer is to perform those activities in this CQAP, *Remedial Action Design* and QAPP deemed necessary to assure the quality of sampling and testing and support quality control efforts.

The sampling quality assurance officer provides the permitting agency an assurance that all sampling efforts, for both field and laboratory analysis, meet or exceed that defined by the *Remedial Action Design* and identified in the CQAP. The sampling quality assurance officer will be on site as required during the

project. The sampling quality assurance officer will report directly to the construction quality assurance officer.

Specific responsibilities of the sampling quality assurance officer include:

- Confirming that the test data are properly recorded and maintained (this may involve selecting reported results and back tracking them to the original observation and test data sheets).
- Confirming that the testing equipment, personnel, and procedures do not change over time or making sure that any changes do not adversely impact the inspection process.
- Confirming that regular calibration of testing equipment occurs and is properly recorded.
- Providing the construction quality control officer with up to date sampling results.

### 3.4 Construction Quality Control Representative TBD

A construction quality control representative, supplemented as necessary by additional personnel, is to be on the work site during the construction process, with complete authority to take any action necessary to ensure compliance with the *Remedial Action Design* as necessary to achieve quality in the constructed facility. The construction quality control representative will be the field engineer. Specific responsibilities of the construction quality control representative include:

- Reviewing the *Remedial Action Design* for clarity and completeness so that the construction activities can be effectively implemented.
- Observe and document contractor's construction quality for compliance with this CQAP.
- Verifying that a contractor's construction quality is in accordance with this CQAP.
- Performing on-site inspection of the work in progress to assess compliance with the *Remedial Action Design*.
- Prepare transportation manifests for the transportation of non-hazardous waste, hazardous waste, and conditionally exempt materials (i.e., soil, water, debris).
- Prepare a transportation log documenting all loads of solid or liquid waste that are transported off site. The Transportation Log will be submitted at the end of each week in electronic format to Mr. Tracy Blazicek, NYSEG project manager at [tblazicek@nyseg.com](mailto:tblazicek@nyseg.com).
- Perform the duties of the health & safety officer.
- Reporting the results of all observations and tests as the work progresses and modify materials and work to comply with *Remedial Action Design*. This includes:
  1. Providing reports on real time ISS mix, material shipments, and inspection results.
  2. Review and interpretation of all data sheets and reports.
  3. Identification of work that should be accepted, rejected, or uncovered for observation, or that may require special testing, inspection, or approval.

4. Rejection of defective work and verification that corrective measures are implemented
  5. Make observations and records that will aid in finalization of the Final Report.
- Reporting to the construction quality assurance officer results of all inspections including work that is not of acceptable quality or that fails to meet the *Remedial Action Design*.
  - Verifying that the equipment used in testing meets the test requirements and that the tests are conducted according to the proper standardized procedures.
  - Verifying that materials are installed as specified, except where necessary field modifications were required.
  - Serves as the overall project emergency coordinator and have ultimate authority in specifying and facilitating any contingency action during any potential emergencies when the *Contingency Plan* is implemented.

The construction quality control representative will report directly to the sampling quality assurance officer.

### 3.5 Sampling Representative TBD

A sampling representative, supplemented as necessary by additional personnel, is to be on the work site at all times during the construction process. The sampling representative reports directly to the sampling quality assurance officer. Specific responsibilities of the sampling representative include:

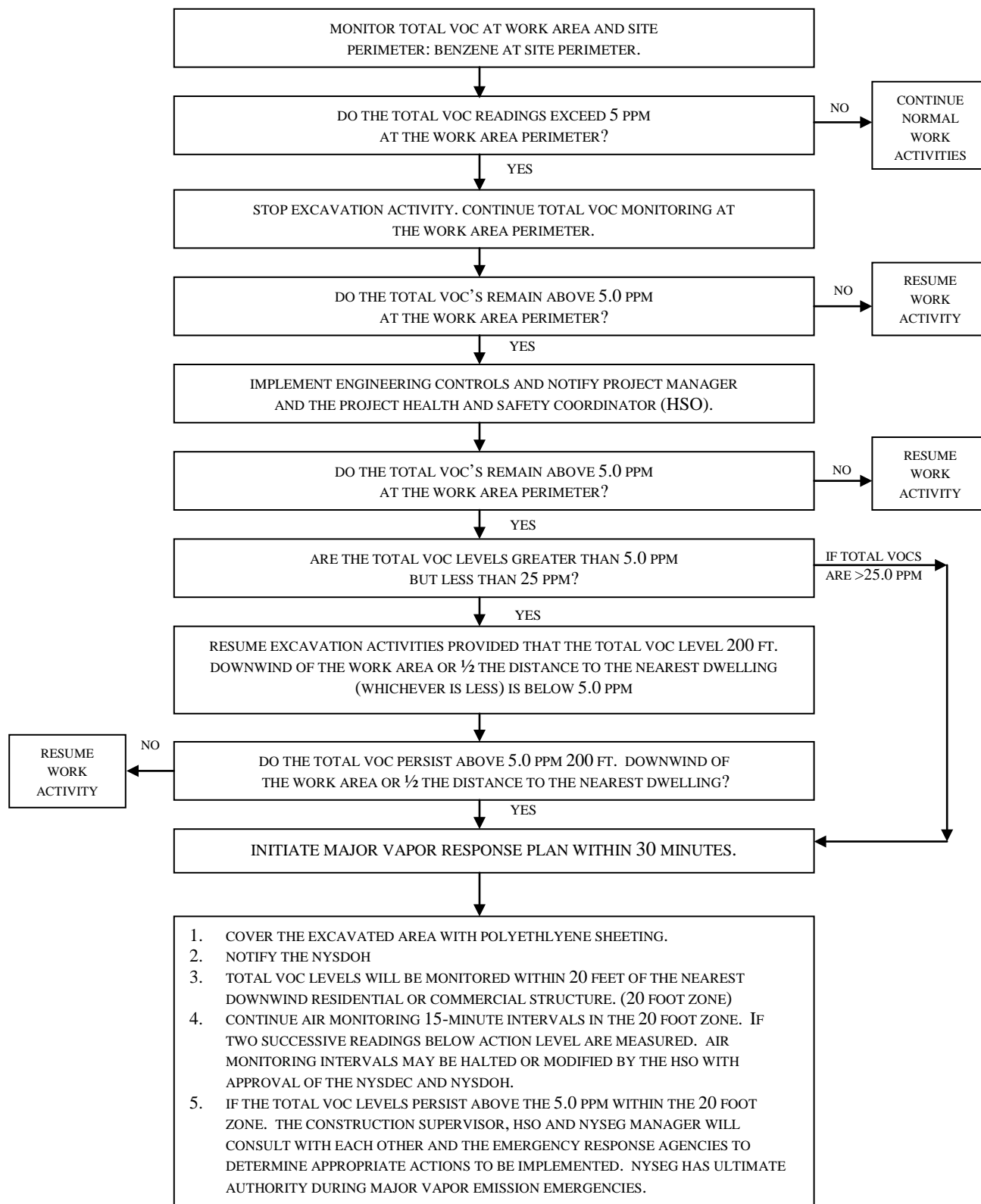
- Set up and operation of the weather station.
- Daily recording of meteorological data.
- Daily calibration and operation of real time total volatile organic compound (VOCs), suspended particulate, and benzene monitoring equipment.
- Daily recording of real-time air quality data. Informs project coordinator and on-site New York State Department of Health (NYSDOH) representatives when concentration of air contaminants approaches or exceeds action levels specified in the Work Plan. Submit real-time air quality data in an electronic format to Melissa Doroski, NYSDOH at [melissa.doroski@health.ny.gov](mailto:melissa.doroski@health.ny.gov), Ms. Sarah Saucier, NYSDEC at [sarah.saucier@dec.ny.gov](mailto:sarah.saucier@dec.ny.gov) and Mr. Tracy Blazicek, NYSEG project manager at [tblazicek@nyseg.com](mailto:tblazicek@nyseg.com) as required by the site *Community Air Monitoring Plan (CAMP)*.
- Daily calibration and operation of the portable gas chromatograph per guidelines specified in the *QAPP and Remedial Design*. Compiling calibration and results data onto spreadsheets. E-mailing compiled data to sampling quality assurance officer daily.
- Collection, packaging, and shipment of soil and water samples per guidelines specified in the *QAPP and Sampling Analysis Plan*. Maintaining a master log of all air, water, and soil samples collected. Faxing copies of the chain-of-custody sheets to the sampling quality assurance officer daily. Tracking confirmation sample points and construction of a map depicting confirmation sample point locations.

- Consultation with sampling quality assurance officer for all technical questions, problems, considerations, or requests for supplies or equipment.
- Maintaining and organizing on-site field specialist equipment and supplies storage area.
- Performing the duties of assistant health & safety officer.

## **Appendix F**

### **Site Vapor Emission Response Plan**

**NORWICH FORMER MGP REMEDIATION  
VAPOR EMISSION RESPONSE PLAN**



# **Appendix G**

## **Contingency Plan**





# Final Phase 1 Remedial Design Report Contingency Plan

**Site:**

Norwich Former Manufactured Gas Plant Off-site Target Area  
Front Street  
Norwich, Chenango County, New York

**Submitted to:**

New York State Department of Environmental Conservation  
Department of Environmental Remediation  
625 Broadway  
Albany, NY 12233-7012

**Prepared for:**

New York State Electric & Gas Company  
James A. Carrigg Center, 18 Link Drive  
P.O. Box 5224  
Binghamton, New York 13902-5224

**Prepared by:**

AECOM  
40 British American Blvd.  
Latham, New York 12110

July 2016

AECOM Project No. 60345362.1



# Final Phase 1 Remedial Design Report Contingency Plan

**Site:**

Norwich Former Manufactured Gas Plant  
Off-site Target Area  
Front Street  
Norwich, Chenango County, New York

Author: Scott T. McDonough

Title: Environmental Engineer

**Submitted to:**

NYSDEC  
Department of Environmental Remediation  
625 Broadway  
Albany, NY 12233-7012

Date: 7/11/2016

Reviewer: Scott Underhill, P.E.

**Prepared for:**

New York State Electric & Gas Company  
James A. Carrigg Center, 18 Link Drive  
P.O. Box 5224  
Binghamton, New York 13902-5224

Title: Project Manager

Date: 7/11/2016

**Prepared by:**

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December 2015

AECOM Project No. 60345362.1

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## **1.0 INTRODUCTION**

This construction contingency plan (CCP) has been developed for personnel to follow during the performance of the remediation project at the New York State Electric & Gas Corporation (NYSEG) Norwich Off-site Target Area, in the City of Norwich, Chenango County, New York. The focus of the work is to mitigate the impacts of manufactured gas plant (MGP) by-product associated with the site. The project will consist of mobilization, excavation of contaminated soils, in-situ stabilization (ISS), material handling, staging, loading, restoration, equipment decontamination, and demobilization. Soils contain contaminants that may be considered non-Resource Conservation and Recovery Act (RCRA) and RCRA hazardous waste. This CCP provides procedures and guidelines that will be implemented in the event of a spill, release, fire, explosion, or other emergency. The CCP includes information necessary to prevent or minimize hazards to human health and the environment.

This CCP was prepared in accordance with United State Environmental Protection Agency (USEPA) and Occupational Health and Safety Administration (OSHA) guidance documents. This CCP supplements the Health and Safety Plan (HASP) that has been prepared separately for the stated field activities. Reasonable precautions will be taken by the Contractor and its subcontractors to prevent an emergency situation. However; in the event that an emergency occurs, this CCP will be carried out immediately and will govern the procedures to be followed. Subcontractors will be provided with copies of this CCP and will be required to follow the CCP.

### **1.1 PRE-PLANNING**

In order to handle emergencies effectively, planning is essential. Decisive action is imperative when an emergency arises. Procedures shall be in place to immediately respond to an emergency situation. Site personnel shall be knowledgeable of their roles and responsibilities. Supplies and equipment shall be on hand and in good working order to address the emergency. Delays can create life-threatening situations.

Prior to the start of the Project, the emergency coordinator (EC) will meet with the outside response agencies (fire, police, EMS and medical) to coordinate response efforts. During the initial meeting, response personnel will be briefed on the scope of work at the site; various response situations, site access control measures, and types of incidents for which response may be required. Each response agency will be kept informed as site activities and conditions change during field activities.

## **2.0 KNOWN CONTAMINANTS OF CONCERN**

Based on previous site activities and the site history, the contaminants of concern are MGP related chemicals and are anticipated to be encountered. These include volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs) (polycyclic aromatic hydrocarbons [PAHs]).

### **3.0 PLANNED FIELD ACTIVITIES**

The planned field activities include the following:

- Site preparation (installation of support facilities);
- Construction of decontamination pad;
- Construction of staging areas;
- Excavation of soils;
- Material Handling and dewatering activities;
- Water disposal;
- Loading of soils;
- ISS;
- Equipment Decontamination; and
- Demobilization.

#### **4.0 RESPONSIBILITIES AND DESIGNATION OF EMERGENCY COORDINATOR**

The emergency coordinator (EC) or his alternate is responsible for implementing this CCP during an emergency. The EC will also act as the site health safety officer (HSO) to maintain continuity in the lines of authority during an emergency. The site HSO/EC reports to the project superintendent, who reports to the project manager on a daily basis. An alternative EC, who will act in the absence of the project HSO/EC, will be designated in case of the primary EC absence. All site employees must be familiar with the procedures in this plan and are responsible for implementing the plan should the EC or the alternate be unavailable.

At the beginning of the site activities, the EC/HSO will designate one or more employees of the project team in conjunction with any subcontractor, to serve as part of a rescue team. At a minimum, the rescue team will consist of two persons. The rescue team will communicate with the project manager on a daily basis.

The rescue team will respond to emergencies, as needed, and will be under the direction of the EC/HSO. The members of the team must be certified in cardiopulmonary resuscitation (CPR) and emergency first aid.

A list of off-site emergency personnel is provided at the back of this plan. The EC/HSO will either notify off-site personnel or designate someone to do so. The first responders consist of police, fire, ambulance, and possibly the New York State Department of Environmental Conservation (NYSDEC). They will be alerted as to the type of emergencies that may arise and the types of hazards at the site.

## 5.0 COMMUNICATIONS

Communications will be by voice where possible. As a backup, visual signals will be used. Hand signals will be as follows:

<b>Hand gripping throat:</b>	<b>Can't breathe.</b>
<b>Grip partner's wrist or place hands around waist:</b>	<b>Leave work area immediately.</b>
<b>Hand on top of head:</b>	<b>Need assistance.</b>
<b>Thumbs up:</b>	<b>OK. I'm all right.</b>
<b>Thumbs down:</b>	<b>No. Negative.</b>

Alternatively, hand-held radios may be used, if they are available and are intrinsically safe. In an emergency, and if necessary, a compressed air horn will be used to notify all workers that an emergency situation exists. The signals shall be as follows:

<b>One long blast:</b>	<b>Evacuate the area by nearest exit.</b>
<b>Two short blasts:</b>	<b>Evacuate by normal exit procedures.</b>

The EC/HSO will notify emergency personnel or designate an alternate to do so. A portable telephone will be used for this purpose. The portable telephone will be located in the clean zone. Emergency telephone numbers are included at the back of this plan.



## **6.0 EVACUATION**

In the event that the air horn is sounded, employees will evacuate the area. Emergency evacuation routes will be designated at the site, prior to initiating field activities. As field activities progress, it will be necessary to modify the evacuation routes, in accordance with site conditions and layout. Evacuation routes must be clear of obstructions. Evacuation routes will be through the fence gate and toward the parking area, depending on the location of the site activities at the time of the emergency. Evacuation maps will be drawn on site layout maps to outline evacuation routes. These maps will be discussed with site personnel to familiarize them with site conditions.

## **7.0 SAFE DISTANCES AND REFUGE**

The following minimum safe distances have been established. Depending upon the nature of the incident, the EC may increase these distances. Arrangements will be made with the local police and fire department to evacuate nearby neighbors. Any decisions on the need for and distances of evacuation will be made in conjunction with the fire and police department and the NYSDEC:

<b>Minor Spills:</b>	<b>Not established</b>
<b>Major Spills:</b>	<b>Evacuate non-essential personnel to clean zone or 1,000 feet, whichever is greater</b>
<b>Minor Fire:</b>	<b>Evacuate non-essential personnel to clean zone</b>
<b>Fire involving a container:</b>	<b>Evacuate all personnel 1/2 mile in all directions</b>
<b>Explosion:</b>	<b>Evacuate all personnel 1/2 mile in all directions</b>

## **8.0 EMERGENCY RESPONSE PROCEDURES**

In the event of any releases of materials the CCP shall be immediately activated. The equipment to respond to an emergency will be on site and activated already. There are additional measures to be taken in the event of an emergency. Emergency equipment that will be present is described in the sections that follow. In addition to this CCP, all responses to releases are subject to controls designated in the site HASP.

## **9.0 MINOR SPILLS DURING DRUM HANDLING AND REMOVAL**

For purposes of the CCP, minor spills would be those that consist of 5 gallons or less. Minor spills will be remediated by removing spill debris with any underlying or surrounding contaminated soil. The spilled material will be handled as hazardous waste. If leaking, the container will be placed in an overpack drum. Additional emergency measures would not be implemented, unless needed. The contractor will have empty drums, speedi-dri, miscellaneous hand tools, fire extinguishers, absorbent pads, and booms to deal with minor spills that occur on site.

## **10.0 MINOR SPILLS IN THE DRUM STAGING OR STORAGE AREAS**

Minor spills onto soil will be cleaned up as discussed above. Minor spills that occur in other areas will need to be collected using absorbent material such as absorbent pads and/or speedi-dri.

## **11.0 MAJOR SPILLS**

For purposes of this CCP, a major spill is defined as those that involve greater than 5 gallons of material. In the event of a major spill, communication and notification procedures will be implemented. The response will depend on the nature of the release. Attempts will be made to control the release by diking and draining the area. An absorbent pad, Oil Dry, or soil will be used to absorb the release. The removed material will be placed into appropriate drums and sealed to prevent hazards. Employees should note that absorbents solidify the liquid, but do not remove the fire or exposure hazards. Solvents will volatilize from the absorbent and can ignite. Therefore, a fire extinguisher will be brought to the area of the release by the emergency response team until the material is secured inside a drum. In the event that the release is of sufficient magnitude and can not be controlled by diking, damming, absorbing, or other method, the local fire department, the NYSDEC, and National Response Center shall be notified.

The local responders would be notified through 911. The Norwich Fire Department would be the first responders. The City of Norwich has a Hazardous Materials Team and has capabilities of performing Level A and Level B response actions. If the incident requires Haz Mat response, 911 should be called and the appropriate emergency response personnel will be contacted.

## **12.0 CONFINED SPACE EMERGENCIES**

Each employee entering a confined space will wear a safety harness equipped with a lifeline for evacuation purposes in the case of an emergency, unless the lifeline creates more of a hazard for the individual in the space. Emergency equipment such as lifelines, breathing equipment, fire extinguishers and harnesses will be ready for immediate response in case an emergency situation arises.

### **13.0 FIRE**

A fire extinguisher will be used on minor fires where a container is not involved. If the fire can not be extinguished immediately or a container is involved, the area must be evacuated immediately and the fire department notified from a safe location. Extinguishing methods include CO2 or dry chemical. A water spray can also be used (not a direct hose stream). Foam, water spray, or fog can be used on larger spills.



## **14.0 EXPLOSION**

In the event of an explosion, the area shall immediately be evacuated and the fire department notified. The cause of the explosion should be assessed and corrected prior to reentry.

## **15.0 MEDICAL**

Medical emergencies are addressed in the HASP. Appropriate first aid will be administered, and if necessary, the injured individual will be sent to the designated medical facility. An ambulance will be summoned, if needed. The cause of the accident will be determined and corrected, prior to continuing operations. A first aid kit will be maintained in the office trailer at all times.

When possible, injured personnel will be decontaminated or partially decontaminated in accordance with the HASP. Based upon the anticipated toxicity of the contaminants, personnel decontamination procedures may be eliminated in a life-threatening situation. Emergency medical personnel will be notified as to the lack of decontamination. Emergency medical personnel will wash with soap and potable water after handling the victim. Appropriate documentation should be completed in accordance with the HASP.

## **16.0 TRAINING**

All employees working on site will attend an initial 40-hour health and safety training course, annual 8-hour refresher training, and 8-hour training for managers for conducting work at hazardous waste sites. These courses satisfy the initial and follow-up training requirements of 29 CFR 1910.120 (OSHA regulation of hazardous waste site activities). Individuals working in confined spaces are all confined space entry trained with rescue and recovery training.

Prior to initiating site work, site personnel will be required to attend a training session given by the EC/HSO. This session will include, but is not limited to, the following topics:

- Site history
- Specific hazards
- Hazard recognition
- Standard operation procedures
- Decontamination (personnel and equipment)
- Emergency procedures

## **17.0 SEVERE WEATHER CONDITIONS**

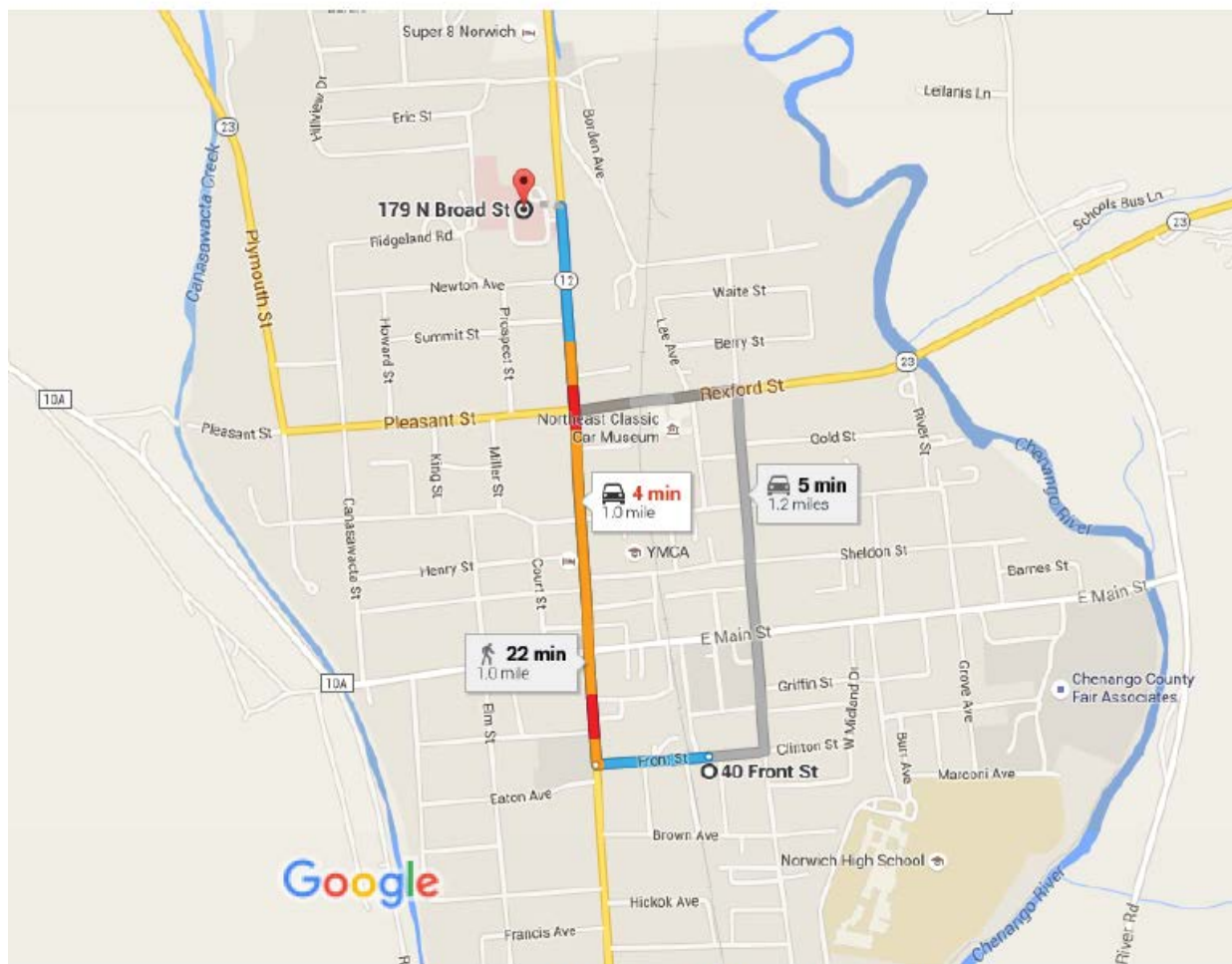
When a hurricane, flood, freeze-up or other severe weather-related threat is detected, all site personnel will immediately be notified. Each Severe Weather Alert will require last-minute preventative measures to minimize potential damage to facilities and equipment. For example, steps such as checking drains, removing electrical material from open yards, protecting soil piles and excavations and managing sheet flow of water will have to be evaluated depending on weather conditions.

## **18.0 EMERGENCY TELEPHONE NUMBERS**

Emergency telephone numbers and directions to the nearest medical facility are shown below and will be kept by field personnel while on-site. These telephone numbers should be posted next to the closest telephone.

<b><u>Name</u></b>	<b><u>Telephone Number</u></b>
NYSEG Site	TBD
Norwich Fire Department	911
Ambulance	911
Police Department	911
Chenango County Sheriff	911
Chenango Memorial Hospital	(607) 337-4157
National Response Center	(800) 424-8802
New York Department of Environmental Conservation	(800) 457-7362
INFOTRAC (Emergency Technical Information)	(800) 535-5053

**Direction to Chenango Memorial Hospital:** Exit site from Truck Gate; turn left (west) on Front Street; proceed along Front Street to the intersection of US Route 12; turn right (north) on US Route 12; turn left into Chenango Memorial Hospital (app. 1.1 mile from site)



Map data ©2015 Google 1000 ft

## **Appendix H**

### **ISS Bench Testing and Previous ISS Work QA/QC Data**



1359-A Ellsworth Industrial Blvd • Atlanta, GA 30318 • TEL 404-636-0928 • FAX 404-636-7162

November 10, 2009

Carsten Floess Senior Geotechnical Engineer  
AECOM  
40 British American Blvd.  
Latham, NY 12110

Re: In Situ Soil Stabilization/Solidification Treatability Study  
Norwich, NY MGP Site  
KEMRON Project # SE-0301

Dear Mr. Floess

KEMRON Environmental Services is pleased to provide this final report for the above reference site. The treatability study was conducted based on the Treatability Study Work Plan provided to KEMRON and dated February 2009. The study included untreated material physical properties characterization, mixture evaluations, and treated material physical properties testing.

On April 6, 2009, KEMRON received 18 samples identified as: Sand/Silt Unit Core, Gravel Unit Core, and Fill Unit Core, Fill Composite, Gravel Composite, Sand/Silt Composite, ISS 2 Sand(4-5) ISS 2 Gravel Top(5-6), ISS 2 Gravel Bottom(8-10), ISS 1 Sand(6-7), ISS 1 Gravel Top(7-8), ISS 1 Gravel Bottom(19-20), ISS 4 Sand(3-5), ISS 4 Gravel Top(5-7), ISS 4 Gravel Bottom(16-18), ISS 3 Sand(2-4), ISS 3 Gravel Top(4-6), and ISS 3 Gravel Bottom(10-12). The characterization included selected testing for: Particle Size Analysis (ASTM D422), Atterberg Limits (ASTM D4318), Moisture Content (ASTM D2216), pH (EPA Method 9045), Permeability (ASTM D5084 or D2434), and Bulk Density (ASTM D2937). Initial characterization results of the untreated material physical properties testing are summarized in **Table 1**. The initial characterization physical property data reports are provided in **Appendix A**

KEMRON understands that site activities consist of in-situ remediation. As such, additives were incorporated into the untreated materials as a pumpable slurry to facilitate in-situ auger mixing. Mixture development was performed by introducing the reagent slurry into the site sediments while mixing using a standard bench-top mixer. All reagents and water were added on a by-weight basis. For example, with a mixture containing a 10% addition of reagent and 8% water addition, 10 grams of reagent will be slurried with 8 grams of water and then blended with 100 grams of the site sediment. The mixture designs were developed by AECOM.

Mixtures on three materials (Fill Composite, Gravel Composite, and Sand/Silt Composite) were prepared. The mixtures were allowed to cure for 28 days at room temperature in preformed cylindrical molds enclosed in sealed plastic bags to prevent moisture loss. KEMRON conducted Moisture Content (ASTM D2216) and pH (EPA Method 9045) immediately following mixing. During the curing period, KEMRON measured pocket penetrometer at 3, 5, and 7 days of curing. After 7, 14, and 28 days of curing, KEMRON conducted Unconfined Compressive



Strength (UCS) testing in accordance with ASTM Method D2166. After 28 days of curing, KEMRON conducted Permeability testing (ASTM D5084).

UCS testing was performed by removing the cured sample specimen from the cylindrical mold. The weight and physical dimensions of the sample were determined and recorded on the appropriate data sheet. The specimen was then placed in the load frame and compressed at a rate of 1% strain per minute until the sample fails or 15% strain has been achieved. Throughout the testing KEMRON documents the load at specific strain values. A representative aliquot of the post test specimen are then subjected to moisture content testing.

Permeability testing was conducted by recording the weight and physical dimensions of the sample specimen. The specimen was then placed into a flexible wall permeameter with a 2 psi confining pressure applied to the water surrounding the specimen. This differential is utilized to ensure that the specimen integrity is not compromised. Testing was initiated by saturating the specimen with de-aired water. Saturation was accomplished over time by increasing the backpressure applied to the sample in increments of 10 psi until a 95% saturation value was achieved. Once saturated, the sample was then consolidated using a 10 psi confining pressure. That is, the pressure differential between the confining pressure, applied to the outside of the sample, was 10 psi higher than the backpressure applied to the specimen itself. The quantity of water forced out of the sample was recorded over time and plotted to ensure appropriate consolidation had been achieved.

Following consolidation of the sample the hydraulic conductivity was determined. Water was allowed to pass through the sample from the bottom to the top of the specimen. Initially water is passed through the sample using gravity alone. In the event that the permeability of the specimen is extremely low a hydraulic gradient is utilized to speed up the testing. The gradient is accomplished by increasing the pressure of the inlet water compared to the outlet water pressure to force water through the specimen. The quantity of water passing into the specimen and the quantity of water exiting the specimen are recorded versus time to determine the permeability of the sample.

The pocket penetrometer testing results are summarized in **Table 2**. Mixture development sheets are provided in **Appendix B**. Treated Soil Moisture Content and pH testing results are summarized in **Table 3** and the data reports are provided in **Appendix C**. Treated Soil Permeability testing results are summarized in **Table 4** and the data reports are provided in **Appendix D**. Treated Soil Unconfined Compressive Strength testing results are summarized in **Table 5** and the data reports are provided in **Appendix E**. The Chain of Custodies received on April 6, 2009 are provided in **Appendix F**.

If you have any questions concerning the data provided in this report, please do not hesitate to call at 404-601-6927.

Sincerely,

KEMRON Environmental Services, Inc.

A handwritten signature in black ink, appearing to read "Erik McClanahan".

Erik McClanahan  
Project Manager

A handwritten signature in blue ink, appearing to read "Tommy A. Jordan".

Tommy A. Jordan,  
P.G. Program Manager

Attachments

## DATA TABLES

NORWICH MGP SITE  
AECOM  
TABLE 1  
INITIAL CHARACTERIZATION RESULTS

TESTING PARAMETERS	TEST METHOD	UNIT	RESULTS																	
			Sand Silt Unit (1-3.5) Core	Gravel Unit (15-17.5) Core	Fill Unit (4-6') Core	Fill Composite	Gravel Composite	Sand / Silt Composite	ISS 2 Sand (4-5)	ISS 2 Gravel Top (5-6)	ISS 2 Gravel Bottom (8-10)	ISS 1 Sand (6-7)	ISS 1 Gravel Top (7-8)	ISS 1 Gravel Bottom (19-20)	ISS 4 Sand (3-5)	ISS 4 Gravel Top (5-7)	ISS 4 Gravel Bottom (16-18)	ISS 3 Sand (2-4)	ISS 3 Gravel Top (4-6)	ISS 3 Gravel Bottom (10-12)
PHYSICAL PROPERTIES																				
Particle Size Analysis	ASTM D422																			
- Gravel		%	3.5	0	37.3	18.5	33.2	3.5	2.6	42.3	50.0	10.1	22.4	21.2	5.7	46.7	57.1	0.0	59.2	38.6
- Sand		%	8.3	74.1	38.5	49.3	48.6	30.6	21.2	44.9	30.4	59.4	53.7	68.8	24.8	36.6	36.7	10.7	32.8	46.5
- Silt		%	66.5	21.6	15.8	20.5	12.2	43.8	59.4	3.6	13.5	17.7	15.4	7.0	43.1	10.3	2.9	74.4	3.6	10.6
- Clay		%	21.7	4.3	8.4	11.7	6.0	22.1	16.8	9.2	6.1	12.8	8.5	3.0	26.4	6.4	3.3	14.9	4.4	4.3
Atterberg Limits	ASTM D4318																			
- Liquid Limit		-	28	NL	22	31	22	26	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
- Plastic Limit		-	23	NP	16	22	19	21	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
- Plasticity Index		-	5	NPI	6	9	3	5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Moisture Content	ASTM D2216	%	28.09	24.14	6.02	12.39	13.81	23.18	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
pH	EPA 9045	S.U.	6.73	7.02	7.97	7.86	8.18	7.46	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Permeability	ASTM D5084	cm/sec	1.0 E-04	8.14 E-05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Permeability	ASTM D2434	cm/sec	NA	NA	9.79 E-05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bulk Density	ASTM D2937	pcf	114.5	115.8	116.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:  
NL = No Liquid Limit  
NP = No Plastic Limit  
NPI = No Plasticity Index  
NA = Not Applicable

**TABLE 2  
STABILIZATION EVALUATIONS - POCKET PENETROMETER RESULTS**

KEMRON SAMPLE No.	UNTREATED MATERIAL	REAGENT TYPE	Reagent ID			Reagent Addition (%)	Water Addition (%)	Penetrometer Testing (tons/ft <sup>2</sup> )		
								3 Day	5 Day	7 Day
0301-001	Sand / Silt	PC	818			5	2.18	> 4.5	> 4.5	> 4.5
0301-002	Sand / Silt	PC	818			10	4.23	> 4.5	> 4.5	> 4.5
0301-003	Sand / Silt	PC	818			15	6.79	> 4.5	> 4.5	> 4.5
0301-004	Sand / Silt	PC / Bent	818	718		10.0 / 1.0	6.85	> 4.5	> 4.5	> 4.5
0301-005	Sand / Silt	PC / Bent	818	718		10.0 / 2.0	9.18	> 4.5	> 4.5	> 4.5
0301-006	Sand / Silt	PC / CKD	818	841		5.0 / 10.0	9.30	3.0	4.0	> 4.5
0301-007	Sand / Silt	PC / CKD	818	841		5.0 / 15.0	18.92	3.0	4.25	> 4.5
0301-008	Sand / Silt	PC / CKD	818	841		5.0 / 25.0	26.71	3.5	4.25	> 4.5
0301-009	Sand / Silt	PC / CKD / Bent	818	841	718	5.0 / 15.0 / 1.0	19.73	4.0	4.25	> 4.5
0301-010	Sand / Silt	PC / CKD / Bent	818	841	718	5.0 / 15.0 / 2.0	21.14	3.5	4.25	> 4.5
0301-011	Sand / Gravel	PC	818			5	2.02	> 4.5	> 4.5	> 4.5
0301-012	Sand / Gravel	PC	818			10	4.12	> 4.5	> 4.5	> 4.5
0301-013	Sand / Gravel	PC	818			15	6.39	> 4.5	> 4.5	> 4.5
0301-014	Sand / Gravel	PC / Bent	818	718		10.0 / 1.0	7.31	4.0	> 4.5	> 4.5
0301-015	Sand / Gravel	PC / Bent	818	718		10.0 / 2.0	9.05	4.3	> 4.5	> 4.5
0301-016	Sand / Gravel	PC / CKD	818	841		5.0 / 10.0	12.09	3.75	4.25	> 4.5
0301-017	Sand / Gravel	PC / CKD	842	841		5.0 / 15.0	18.95	3.75	4.25	> 4.5
0301-018	Sand / Gravel	PC / CKD	842	841		5.0 / 25.0	23.90	3.5	4.25	> 4.5
0301-019	Sand / Gravel	PC / CKD / Bent	842	841	718	5.0 / 15.0 / 1.0	18.76	4.0	4.5	> 4.5
0301-020	Sand / Gravel	PC / CKD / Bent	842	841	718	5.0 / 15.0 / 2.0	21.35	4.25	> 4.5	> 4.5

> 4.5 EXCEEDS POCKET PENETROMETER

PC = Portland Cement

Bent = Bentonite

CKD = Cement Kiln Dust

TABLE 3

STABILIZATION EVALUATIONS - MOISTURE CONTENT - ASTM D2216

STABILIZATION EVALUATIONS - pH - EPA METHOD 9045

KEMRON SAMPLE No.	UNTREATED MATERIAL	REAGENT TYPE	Reagent ID			Reagent Addition (%)	Water Addition (%)	Ph (S.U.)	Moisture Content (%)
0301-001	Sand / Silt	PC	818			5	2.18	11.26	22.96
0301-002	Sand / Silt	PC	818			10	4.23	11.43	22.74
0301-003	Sand / Silt	PC	818			15	6.79	11.44	25.72
0301-004	Sand / Silt	PC / Bent	818	718		10.0 / 1.0	6.85	11.46	26.24
0301-005	Sand / Silt	PC / Bent	818	718		10.0 / 2.0	9.18	11.53	29.10
0301-006	Sand / Silt	PC / CKD	818	841		5.0 / 10.0	9.30	11.66	27.35
0301-007	Sand / Silt	PC / CKD	818	841		5.0 / 15.0	18.92	12.19	35.25
0301-008	Sand / Silt	PC / CKD	818	841		5.0 / 25.0	26.71	12.29	38.42
0301-009	Sand / Silt	PC / CKD / Bent	818	841	718	5.0 / 15.0 / 1.0	19.73	12.27	33.95
0301-010	Sand / Silt	PC / CKD / Bent	818	841	718	5.0 / 15.0 / 2.0	21.14	12.08	37.51
0301-011	Sand / Gravel	PC	818			5	2.04	11.32	12.19
0301-012	Sand / Gravel	PC	818			10	4.12	11.54	13.99
0301-013	Sand / Gravel	PC	818			15	6.39	11.62	20.93
0301-014	Sand / Gravel	PC / Bent	818	718		10.0 / 1.0	7.31	11.46	20.92
0301-015	Sand / Gravel	PC / Bent	818	718		10.0 / 2.0	9.05	11.51	21.96
0301-016	Sand / Gravel	PC / CKD	818	841		5.0 / 10.0	12.11	11.82	27.86
0301-017	Sand / Gravel	PC / CKD	842	841		5.0 / 15.0	18.95	12.40	24.01
0301-018	Sand / Gravel	PC / CKD	842	841		5.0 / 25.0	23.93	12.56	30.24
0301-019	Sand / Gravel	PC / CKD / Bent	842	841	718	5.0 / 15.0 / 1.0	18.76	12.38	24.91
0301-020	Sand / Gravel	PC / CKD / Bent	842	841	718	5.0 / 15.0 / 2.0	21.35	12.35	31.40

PC = Portland Cement

Bent = Bentonite

CKD = Cement Kiln Dust

AECOM  
NORWICH MGP SITE  
TABLE 4

TREATED MATERIAL TESTING  
Summary of Permeability Testing - ASTM D5084

KEMRON SAMPLE No.	SAMPLE MIX DATE	UNTREATED MATERIAL TYPE	REAGENT TYPE	REAGENT ADDITION (%)	PERMEABILITY			
					Moisture Content (%)	Bulk Density (lbs/ft <sup>3</sup> )	Dry Density (lbs/ft <sup>3</sup> )	Permeability (cm/sec)
0301-001	5/1/2009	Sand / Silt	PC	5	22.5	121.5	99.2	7.2 E-07
0301-002	5/1/2009	Sand / Silt	PC	10	21.6	123.2	101.3	1.7 E-08
0301-003	5/4/2009	Sand / Silt	PC	15	21.2	122.8	101.4	3.1 E-09
0301-004	5/5/2009	Sand / Silt	PC / BENT	10.0 / 1.0	24.5	120.0	96.4	1.8 E-08
0301-005	5/5/2009	Sand / Silt	PC / BENT	10.0 / 2.0	26.9	118.6	93.4	2.2 E-08
0301-006	5/5/2009	Sand / Silt	PC / CKD	5.0 / 10.0	25.8	119.3	94.8	2.9 E-08
0301-007	5/6/2009	Sand / Silt	PC / CKD	5.0 / 15.0	33.3	117.1	87.9	5.8 E-08
0301-008	5/6/2009	Sand / Silt	PC / CKD	5.0 / 25.0	37.3	113.5	82.7	9.4 E-08
0301-009	5/6/2009	Sand / Silt	PC / CKD / BENT	5.0 / 15.0 / 1.0	29.6	113.3	87.40	7.5 E-08
0301-010	5/7/2009	Sand / Silt	PC / CKD / BENT	5.0 / 15.0 / 2.0	33.6	113.1	84.70	8.7 E-08
0301-011	5/1/2009	Sand / Gravel	PC	5	10.8	134.7	121.6	1.7 E-07 *
0301-011 (Re-test)	5/1/2009	Sand / Gravel	PC	5	9.70	134.8	122.9	5.8 E-07
0301-012	5/1/2009	Sand / Gravel	PC	10	12.3	128.5	114.4	1.2 E-06
0301-013	5/4/2009	Sand / Gravel	PC	15	15.6	126.6	109.4	2.9 E-08
0301-014	5/5/2009	Sand / Gravel	PC / BENT	10.0 / 1.0	19.2	130.7	109.7	5.7 E-08
0301-015	5/5/2009	Sand / Gravel	PC / BENT	10.0 / 2.0	17.1	129.2	110.3	4.3 E-08
0301-016	5/5/2009	Sand / Gravel	PC / CKD	5.0 / 10.0	19.5	123.2	103.0	3.3 E-07
0301-017	5/7/2009	Sand / Gravel	PC / CKD	5.0 / 15.0	23.8	115.8	93.6	3.2 E-07
0301-018	5/6/2009	Sand / Gravel	PC / CKD	5.0 / 25.0	27.8	115.2	90.10	2.2 E-07
0301-019	5/6/2009	Sand / Gravel	PC / CKD / BENT	5.0 / 15.0 / 1.0	24.0	115.2	92.90	2.1 E-07
0301-020	5/6/2009	Sand / Gravel	PC / CKD / BENT	5.0 / 15.0 / 2.0	24.3	116.5	93.70	1.4 E-07
New Mixes								
0301-021	7/28/2009	Sand/Silt	PC	7.5	19.5	117.3	98.2	2.6 E-07
0301-022	7/29/2009	Sand/Silt	PC/CKD	7.5 / 10	26.1	115.0	91.2	2.5 E-08
0301-023	7/29/2009	Sand/Silt	PC/CKD	10.0 / 10.0	21.6	116.2	95.6	5.4 E-09
0301-024	7/29/2009	Sand/Silt	PC/CKD	10.0 / 15.0	20.6	116.4	96.5	6.7 E-09
0301-025	7/29/2009	Sand/Silt	PC/CKD/BENT	7.5 / 15 / 1.0	23.7	115.0	93.0	1.1 E-08
0301-026	7/29/2009	Sand/Silt	PC/CKD/BENT	10.0 / 15.0 / 1.0	25.8	112.3	89.3	1.3 E-08
0301-027	7/29/2009	Sand/Gravel	PC	5.0	22.3	118.8	97.2	5.1 E-06
0301-028	7/29/2009	Sand/Gravel	PC/BENT	7.5 / 1.0	23.6	125.7	101.7	5.4 E-07
0301-029	7/29/2009	Sand/Gravel	PC/CKD	7.5 / 10.0	28.0	118.8	92.8	1.5 E-06
0301-030	7/29/2009	Sand/Gravel	PC / CKD	10.0 / 10.0	27.5	119.4	93.7	5.8 E-07
0301-031	7/29/2009	Sand/Gravel	PC / CKD / BENT	7.50 / 10.0 / 1.0	25.6	122.8	97.8	3.7 E-07
0301-032	7/29/2009	Sand/Gravel	PC / CKD / BENT	10.0 / 15.0 / 1.0	26.6	121.5	96.0	8.3 E-07

\* Sample full of rocks  
Sample re-tested

PC - PORTLAND CEMENT  
CKD - CEMENT KILN DUST  
BENT - BENTONITE



AECOM  
NORWICH MGP SITE

TABLE 5

TREATED MATERIAL TESTING  
Summary of Unconfined Compressive Strength Testing - ASTM D2166

KEMRON SAMPLE No.	SAMPLE MIX DATE	UNTREATED MATERIAL TYPE	REAGENT TYPE	REAGENT ADDITION (%)	Cure Time (days)	UNCONFINED COMPRESSIVE STRENGTH			
						Moisture Content (%)	Bulk Density (lbs/ft <sup>3</sup> )	Dry Density (lbs/ft <sup>3</sup> )	UCS (lbs/in <sup>2</sup> )
0301-001	5/1/2009	Sand / Silt	PC	5	7	22.23	122.9	100.5	45.0
					14	22.18	122.3	100.1	50.7
					28	22.14	119.5	97.8	37.5
0301-002	5/1/2009	Sand / Silt	PC	10	7	22.71	124.0	101.0	203.9
					14	21.52	123.8	101.9	231.2
					28	21.14	120.3	99.3	212.3
0301-003	5/4/2009	Sand / Silt	PC	15	7	22.48	126.4	103.2	443.8
					14	16.53	126.1	108.2	628.7
					28	21.57	123.9	101.9	704.9
0301-004	5/5/2009	Sand / Silt	PC / BENT	10.0 / 1.0	7	24.47	121.9	97.9	158.9
					14	23.58	120.5	97.5	161.8
					28	22.97	121.8	99.1	325.9
0301-005	5/5/2009	Sand / Silt	PC / BENT	10.0 / 2.0	7	27.63	120.3	94.2	202.2
					14	27.19	119.7	94.1	238.0
					28	27.29	119.7	94.0	261.3
0301-006	5/5/2009	Sand / Silt	PC / CKD	5.0 / 10.0	7	26.47	120.6	95.3	238.0
					14	25.20	120.6	96.3	336.0
					28	25.42	121.7	97.0	400.0
0301-007	5/6/2009	Sand / Silt	PC / CKD	5.0 / 15.0	7	33.86	117.0	87.4	52.2
					14	33.46	115.9	86.8	98.2
					28	33.26	117.2	88.0	129.0
0301-008	5/6/2009	Sand / Silt	PC/CKD	5.0 / 25.0	7	36.53	115.4	84.6	43.5
					14	37.95	112.2	81.3	68.5
					28	36.63	113.9	83.4	87.7
0301-009	5/6/2009	Sand / Silt	PC / CKD / BENT	5.0 / 15.0 / 1.0	7	34.22	114.8	85.6	47.6
					14	35.61	113.7	83.9	68.1
					28	33.48	114.6	85.9	107.6
0301-010	5/7/2009	Sand / Silt	PC / CKD / BENT	5.0 / 15.0 / 2.0	7	36.29	115.5	84.7	40.8
					14	35.81	115.8	85.3	62.6
					28	35.48	115.0	84.9	92.3
0301-011	5/1/2009	Sand / Gravel	PC	5	7	10.74	142.5	128.7	228.7
					14	11.49	142.7	128.0	230.3
					28	10.30	143.6	130.2	379.4
0301-012	5/1/2009	Sand / Gravel	PC	10	7	14.00	132.3	116.1	312.9
					14	13.29	134.9	119.1	320.6
					28	11.70	131.7	117.9	412.8
0301-013	5/4/2009	Sand / Gravel	PC	15	7	17.12	127.0	108.4	516.0
					14	22.86	122.4	99.6	480.0
					28	15.49	128.0	110.8	899.9
0301-014	5/5/2009	Sand / Gravel	PC / BENT	10.0 / 1.0	7	18.43	126.8	107.1	135.5
					14	17.49	127.4	108.4	262.7
					28	18.40	123.0	103.8	239.7
0301-015	5/5/2009	Sand / Gravel	PC / BENT	10.0 / 2.0	7	20.26	119.8	99.6	137.4
					14	19.67	122.1	102.0	176.9
					28	19.50	115.7	96.8	201.1
0301-016	5/5/2009	Sand / Gravel	PC / CKD	5.0 / 10.0	7	22.28	123.9	101.3	45.1
					14	19.20	126.0	105.7	58.9
					28	22.30	124.9	102.1	70.6
0301-017	5/7/2009	Sand / Gravel	PC / CKD	5.0 / 15.0	7	25.24	121.0	96.6	53.6
					14	24.50	122.5	98.4	65.0
					28	21.01	123.2	101.8	81.9
0301-018	5/6/2009	Sand / Gravel	PC/CKD	5.0 / 25.0	7	27.91	121.9	95.3	30.4
					14	25.12	118.5	94.7	51.9
					28	32.08	116.0	87.8	67.6
0301-019	5/6/2009	Sand / Gravel	PC / CKD / BENT	5.0 / 15.0 / 1.0	7	24.70	122.1	97.9	48.1
					14	26.81	120.7	95.2	58.8
					28	23.44	120.0	97.2	69.7
0301-020	5/6/2009	Sand / Gravel	PC / CKD / BENT	5.0 / 15.0 / 2.0	7	28.31	118.1	92.1	41.9
					14	23.88	121.1	97.8	34.6
					28	24.29	117.7	94.7	62.8
0301-021	7/28/2009	Sand/Silt	PC	7.5	28	19.70	124.9	104.3	177.3
0301-022	7/29/2009	Sand/Silt	PC/CKD	7.5 / 10	28	29.92	115.0	88.5	334.3
0301-023	7/29/2009	Sand/Silt	PC/CKD	10.0 / 10.0	28	25.38	118.3	94.3	474.1
0301-024	7/29/2009	Sand/Silt	PC/CKD	10.0 / 15.0	28	27.20	116.4	91.5	473.7
0301-025	7/29/2009	Sand/Silt	PC/CKD/BENT	7.5 / 15 / 1.0	28	28.75	114.8	89.1	241.5
0301-026	7/29/2009	Sand/Silt	PC/CKD/BENT	10.0 / 15.0 / 1.0	28	38.74	115.0	82.9	136.8
0301-027	7/29/2009	Sand/Gravel	PC	5.0	28	23.20	124.0	100.7	42.3
0301-028	7/29/2009	Sand/Gravel	PC/BENT	7.5 / 1.0	28	24.75	123.7	99.1	90.2
0301-029	7/29/2009	Sand/Gravel	PC/CKD	7.5 / 10.0	28	26.79	121.1	95.5	85.6
0301-030	7/29/2009	Sand/Gravel	PC/ CKD	10.0 / 10.0	28	27.02	90.1	71.0	166.8
0301-031	7/29/2009	Sand/Gravel	PC/ CKD / BENT	7.5.0 / 10.0 / 1.0	NT	NT	NT	NT	NT
0301-032	7/29/2009	Sand/Gravel	PC/ CKD / BENT	10.0 / 15.0 / 1.0	NT	NT	NT	NT	NT

NT - NOT TESTED

PC - PORTLAND CEMENT

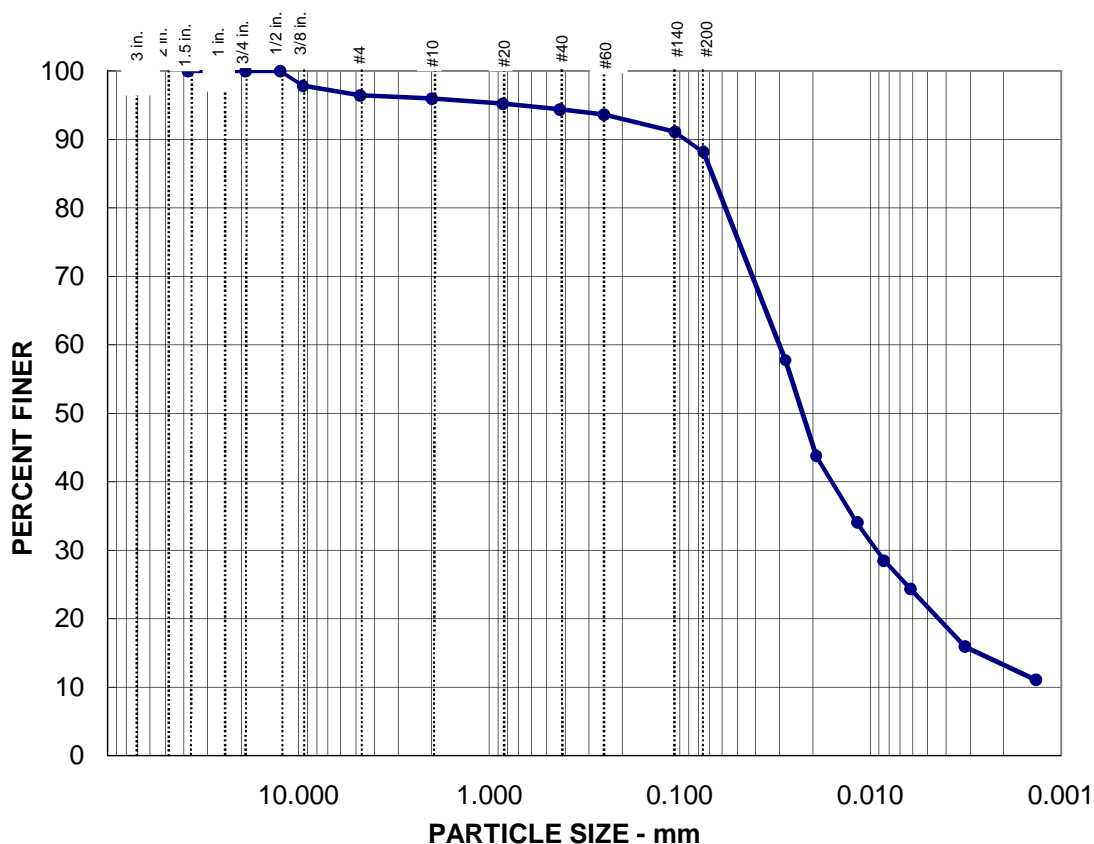
CKD - CEMENT KILN DUST

BENT- BENTONITE



**APPENDIX A**  
**INITIAL CHARACTERIZATION RESULTS**

## PARTICLE SIZE DISTRIBUTION TEST REPORT



% GRAVEL	% SAND	% SILT	% CLAY
3.5	8.3	66.5	21.7

SAMPLE INFORMATION	
Project Name:	Norwich MGP Site
Project Number:	SE0301
Sample ID:	Sand/Silt Core
Sample Description:	Dark brown Silt
Testing Date:	04/10/09

**KEMRON**  
ENVIRONMENTAL SERVICES

SAMPLE CLASSIFICATION	
Liquid Limit:	28
Plastic Limit:	23
Plasticity Index:	5
USCS Classification	
Classification	ML
AASHTO Classification	
Classification	A-4
Group Index	
DESCRIPTION:	
Silt	

# PARTICLE SIZE DISTRIBUTION DATA REPORT

REPORT FORM  
ASTM D422

PROJECT: \_\_\_\_\_ Norwich MGP Site  
PROJECT No.: \_\_\_\_\_ SE0301  
SAMPLE No.: \_\_\_\_\_ Sand/Silt Core  
SAMPLE DESCRIPT: \_\_\_\_\_ Dark brown Silt  
TESTING DATE: \_\_\_\_\_ 04/10/09  
TESTED BY: \_\_\_\_\_ SEM  
TRACKING CODE: \_\_\_\_\_ 5727\_GR

MOISTURE CONTENT (DRY AND WET BASIS)	
TARE WEIGHT	230.19 g
WT WET SOIL + TARE	320.18 g
WT DRY SOIL + TARE	301.21 g
WT WATER, Ww	18.97 g
WT DRY SOIL, Ws	71.02 g
ASTM MOISTURE	26.71 %
EPA MOISTURE	21.08 %

SIEVE NUMBER	PERCENT PASSING
1.5	100.0 %
1.0	100.0 %
0.75	100.0 %
0.5	100.0 %
0.375	97.9 %
#4	96.5 %
#10	96.0 %
#20	95.2 %
#40	94.4 %
#60	93.7 %
#140	91.1 %
#200	88.2 %

HYDROMETER ANALYSIS	
HYDROMETER No.	1
Wt OF DRY SOIL, Ws	62.63
DATE TESTING INITIATED	04/15/09
TIME TESTING INITIATED	12:00:00 PM

ELAPSED TIME (minutes)	ACTUAL READING	CORRECTED READING	DIAMETER (mm)	PERCENT FINER (%)
2	47.0	41.5	0.0279	57.8
5	37.0	31.5	0.0192	43.9
15	30.0	24.5	0.0117	34.1
30	26.0	20.5	0.0085	28.5
60	23.0	17.5	0.0061	24.3
240	17.0	11.5	0.0032	16.0
1400	13.5	8.0	0.0013	11.1

**Kemron**  
ENVIRONMENTAL SERVICES

# ATTERBERG LIMITS

## REPORT FORM ASTM D 4318 (Method B)

Project: Norwich MGP Site  
Project No.: SE-0301  
Sample No.: Sand/Silt Core  
Description: Dark Brown Silt

Testing Date: 4/14/2009  
Tested By: JM  
Tracking Code: 5727\_AT

Liquid Limit Determination		
Pan No.	A	B
Pan Weight	1.12 g	1.08 g
Wet Soil + Pan	8.59 g	9.71 g
Dry Soil + Pan	6.96 g	7.83 g
Wt of Dry Soil, Ws	5.84 g	6.75 g
Wt of Water, Ww	1.63 g	1.88 g
Moisture Content, ASTM	27.89 %	27.83 %
No. of Blows, N	23	22
Correction Factor, K	0.990	0.985
<b>Liquid Limit</b>	<b>28</b>	<b>27</b>

Liquid Limit: 28

Plastic Limit: 23

**Plasticity Index:** 5

N	k
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022

Plastic Limit Determination		
Pan No.	C	D
Pan Weight	1.09 g	1.09 g
Wet Soil + Pan	2.93 g	2.97 g
Dry Soil + Pan	2.58 g	2.62 g
Wt of Dry Soil, Ws	1.49 g	1.53 g
Wt of Water, Ww	0.35 g	0.36 g
Moisture Content, ASTM	23.45 %	23.31 %
<b>Plastic Limit</b>	<b>23 %</b>	<b>23 %</b>

# MOISTURE CONTENT DETERMINATION

## REPORT FORM

PROJECT: Norwich MGP Site  
PROJECT No.: SE-0301  
SAMPLE No.: Sand/Silt Core  
TESTING DATE: 04/10/09  
TESTED BY: SEM  
TRACKING CODE: 5727\_MC

MOISTURE CONTENT (Dry & Wet Basis)			
1. MOISTURE TIN NO.	A	B	C
2. WT MOISTURE TIN (tare weight)	70.88 g	69.00 g	70.74 g
3. WT WET SOIL + TARE	121.52 g	123.59 g	126.34 g
4. WT DRY SOIL + TARE	110.79 g	111.46 g	113.90 g
5. WT WATER, Ww	10.73 g	12.13 g	12.44 g
6. WT DRY SOIL, Ws	39.91 g	42.46 g	43.16 g
7. ASTM MOISTURE CONTENT	26.89 %	28.57 %	28.82 %
8. PERCENT SOLIDS	78.81 %	77.78 %	77.63 %
9. AVERAGE ASTM MOISTURE CONTENT	28.09 %		
10. AVERAGE PERCENT SOLIDS	78.07 %		

# MATERIAL pH

EPA METHOD 9045  
DATA SHEET

PROJECT: Norwich MGP Site

PROJECT No.: SE-0301

TESTING DATE: 4/10/2009

TESTED BY: SEM

TRACKING CODE: 5727\_pH

KEMRON SAMPLE No.		MATERIAL pH
1.	Sand / Silt Core A	6.68
2.	Sand / Silt Core B	6.77
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		
Average:		6.73

# PERMEABILITY ASTM D5084

## SPECIMEN CONDITIONS

Page 1 of 6

PROJECT: Norwich MGP Site  
 PROJECT No.: SE-0301  
 SAMPLE No.: Sand/Silt Core  
 TEST DATE: 4/10/2009

TESTED BY: SEM  
 TRACKING CODE: 5727\_PM  
 EQUIPMENT No.: 2

<b>MOISTURE CONTENT (Dry Basis)</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>1. MOISTURE TIN NO.</b>	Sand/Silt Core	Sand/Silt Core
<b>2. WT MOISTURE TIN (tare weight)</b>	0.00 <b>g</b>	206.48 <b>g</b>
<b>3. WT WET SOIL + TARE</b>	516.90 <b>g</b>	733.20 <b>g</b>
<b>4. WT DRY SOIL + TARE</b>	391.44 <b>g</b>	597.92 <b>g</b>
5. WT WATER, W <sub>w</sub>	125.46 <b>g</b>	135.28 <b>g</b>
6. WT DRY SOIL, W <sub>s</sub>	391.44 <b>g</b>	391.44 <b>g</b>
7. MOISTURE CONTENT, W	32.05 <b>%</b>	34.56 <b>%</b>

<b>SOIL SPECIMEN DIMENSIONS</b>				
<b>TRIPLICATE</b>	<b>DIAMETER</b>		<b>HEIGHT</b>	
<b>ANALYSES</b>	<b>INITIAL</b>	<b>FINAL</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>No. 1</b>	2.87 in.	2.86 in.	2.68 in.	2.68 in.
<b>No. 2</b>	2.87 in.	2.87 in.	2.68 in.	2.68 in.
<b>No. 3</b>	2.88 in.	2.88 in.	2.68 in.	2.68 in.
Average	2.87 in.	2.87 in.	2.68 in.	2.68 in.

<b>SPECIMEN CONDITIONS</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>Specimen WT, W<sub>o</sub></b>	<b>516.90 g</b>	<b>526.81 g</b>
Area, A <sub>o</sub>	6.48 in <sup>2</sup>	6.47 in <sup>2</sup>
Volume, V <sub>o</sub>	17.38 in <sup>3</sup>	17.34 in <sup>3</sup>
Bulk Unit Weight	113.3 lb/ft <sup>3</sup>	115.8 lb/ft <sup>3</sup>
Dry Unit Weight	85.8 lb/ft <sup>3</sup>	86.0 lb/ft <sup>3</sup>

## BACK-PRESSURE SATURATION

TESTED BY:	SEM
TRACKING CODE:	5727_PM
EQUIPMENT No.:	2

\* Saturation check - no data available.



## SPECIMEN CONSOLIDATION

PROJECT:	Norwich MGP Site
PROJECT No.:	SE-0301
SAMPLE No.:	Sand/Silt Core
TEST DATE:	4/10/2009

$$\frac{\text{SEM}}{5727\_PM}$$
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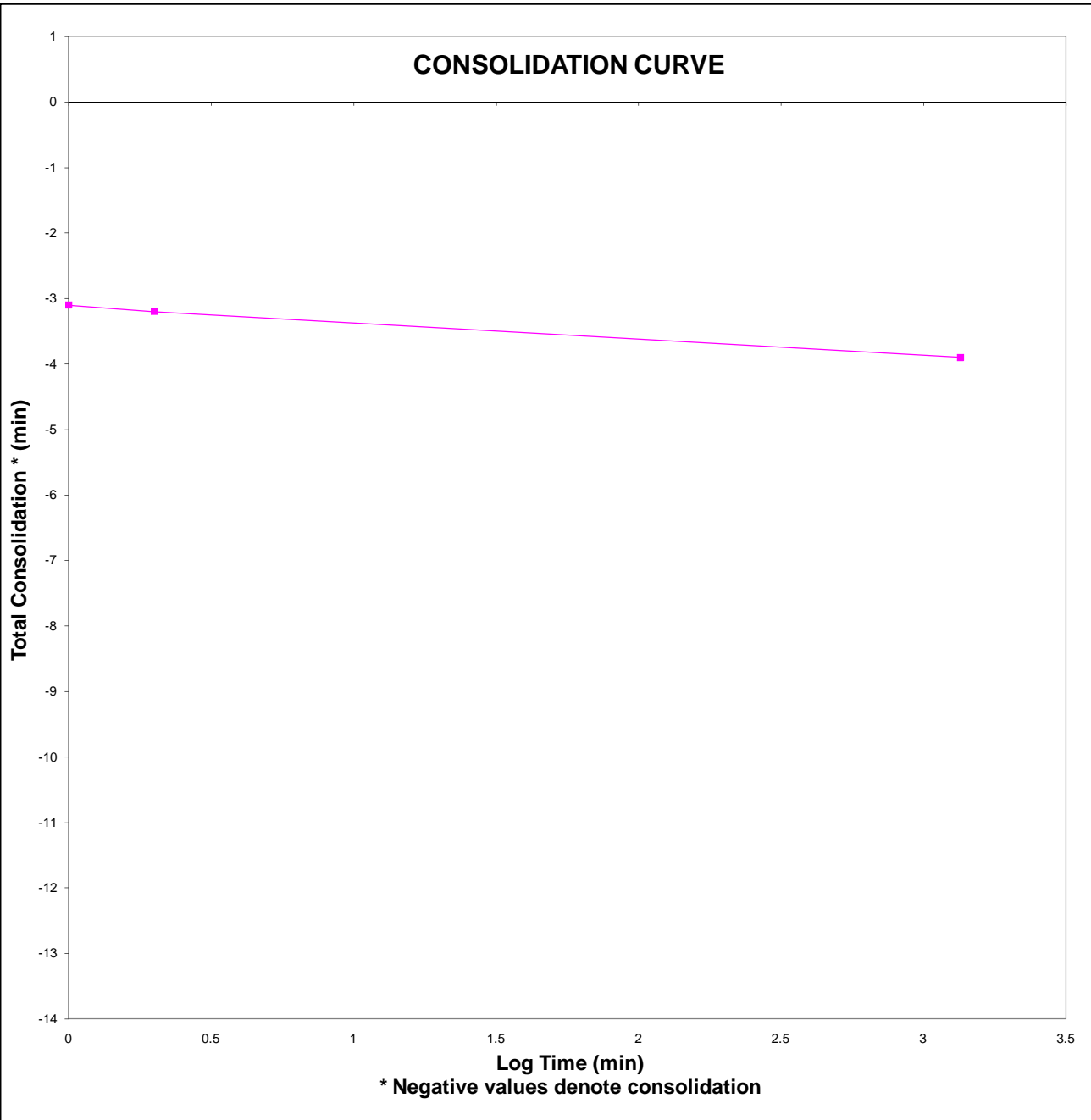
# PERMEABILITY ASTM D5084

## CONSOLIDATION CURVE

Page 4 of 6

PROJECT: Norwich MGP Site  
PROJECT No.: SE-0301  
SAMPLE No.: Sand/Silt Core  
TEST DATE: 4/10/2009

TESTED BY: SEM  
TRACKING CODE: 5727\_PM  
EQUIPMENT No.: 2



## PERMEABILITY ASTM D5084

## TEST DATA

Page 5 of 6

PROJECT:	Norwich MGP Site
PROJECT No.:	SE-0301
SAMPLE No.:	Sand/Silt Core
TEST DATE:	4/10/2009

TESTED BY:	SEM
TRACKING CODE:	5727_PM
EQUIPMENT No.:	2

[illegible]

**TEST DATA (continued)**

Page 6 of 6

TESTED BY:	SEM
TRACKING CODE:	5727_PM
EQUIPMENT No.:	2

[illegible]

# PERMEABILITY ASTM D5084

## SUMMARY OF RESULTS

PROJECT: Norwich MGP Site  
PROJECT No.: SE-0301  
SAMPLE No.: Sand/Silt Core  
TEST DATE: 4/10/2009

TESTED BY: SEM  
TRACKING CODE: 5727\_PM  
EQUIPMENT No.: 2

TESTING PARAMETER	INITIAL	FINAL
BULK UNIT WEIGHT	113.3 lb/ft <sup>3</sup>	115.8 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	85.8 lb/ft <sup>3</sup>	86.0 lb/ft <sup>3</sup>
MOISTURE CONTENT	32.1 %	34.6 %
PERMEABILITY @ 20°C	1.0E-04 cm/sec	

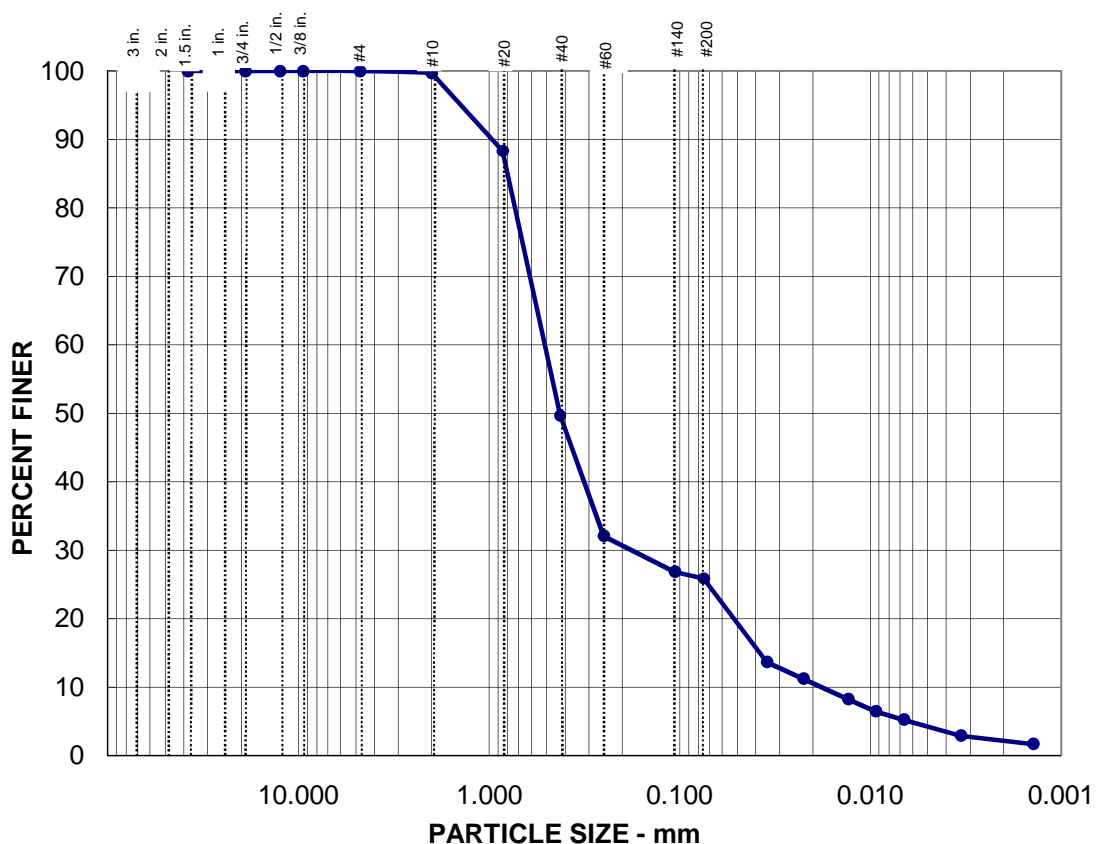
# UNIT WEIGHT DETERMINATION

## DATA SHEET

PROJECT: Norwich MGP Site  
PROJECT No.: SE-0301  
SAMPLE No.: Silt/Sand Core  
TESTING DATE: 04/09/09  
TESTED BY: SEM  
TRACKING CODE: 5727\_UW

UNIT WEIGHT (DENSITY)			
1. SAMPLE NO.	Top	Mid	Bottom
2. WT OF MOLD (tare weight)	0.00 g	0.00	0.00
3. WT OF MOLD + SOIL	960.50 g	1064.80	1218.80
4. WT OF WET SOIL, W	960.50 g	1064.80	1218.80
5. DIAMETER OF SPECIMEN, D	2.82 in	2.88	2.88
6. HEIGHT OF SPECIMEN, H	5.58 in	5.60	5.60
7. VOLUME OF SPECIMEN	34.85 in <sup>3</sup>	36.48	36.48
8. BULK UNIT WEIGHT	105.0 pcf	111.2	127.3
9. BULK SPECIFIC GRAVITY	1.7	1.8	2.0
10. AVERAGE BULK UNIT WEIGHT	114.5 pcf		
11. AVERAGE BULK SPECIFIC GRAVITY	1.8		

## PARTICLE SIZE DISTRIBUTION TEST REPORT



% GRAVEL	% SAND	% SILT	% CLAY
0.0	74.1	21.6	4.3

SAMPLE INFORMATION	
Project Name:	Norwich MGP Site
Project Number:	SE0301
Sample ID:	Gravel Core
Sample Description:	Dark Gray Silty Sand
Testing Date:	04/10/09

**KEMRON**  
ENVIRONMENTAL SERVICES

SAMPLE CLASSIFICATION	
Liquid Limit:	NL
Plastic Limit:	NP
Plasticity Index:	NA
USCS Classification	
Classification	SM
AASHTO Classification	
Classification	A-2-4
Group Index	
DESCRIPTION:	
Silty Sand	

# PARTICLE SIZE DISTRIBUTION DATA REPORT

REPORT FORM  
ASTM D422

PROJECT: \_\_\_\_\_ Norwich MGP Site  
PROJECT No.: \_\_\_\_\_ SE0301  
SAMPLE No.: \_\_\_\_\_ Gravel Core  
SAMPLE DESCRIPT: \_\_\_\_\_ Dark Gray Silty Sand  
TESTING DATE: \_\_\_\_\_ 04/10/09  
TESTED BY: \_\_\_\_\_ SEM  
TRACKING CODE: \_\_\_\_\_ 5728\_GR

MOISTURE CONTENT (DRY AND WET BASIS)	
TARE WEIGHT	228.26 g
WT WET SOIL + TARE	330.74 g
WT DRY SOIL + TARE	311.00 g
WT WATER, Ww	311.13 g
WT DRY SOIL, Ws	82.74 g
ASTM MOISTURE	376.03 %
EPA MOISTURE	303.60 %

SIEVE NUMBER	PERCENT PASSING
1.5	100.0 %
1.0	100.0 %
0.75	100.0 %
0.5	100.0 %
0.375	100.0 %
#4	100.0 %
#10	99.8 %
#20	88.4 %
#40	49.7 %
#60	32.1 %
#140	26.9 %
#200	25.9 %

HYDROMETER ANALYSIS	
HYDROMETER No.	2
Wt OF DRY SOIL, Ws	21.44
DATE TESTING INITIATED	04/15/09
TIME TESTING INITIATED	12:01:00 PM

ELAPSED TIME (minutes)	ACTUAL READING	CORRECTED READING	DIAMETER (mm)	PERCENT FINER (%)
2	17.0	11.5	0.0349	13.7
5	15.0	9.5	0.0224	11.3
15	12.5	7.0	0.0131	8.3
30	11.0	5.5	0.0093	6.5
60	10.0	4.5	0.0066	5.3
240	8.0	2.5	0.0034	2.9
1400	7.0	1.5	0.0014	1.7

**Kemron**  
ENVIRONMENTAL SERVICES



# ATTERBERG LIMITS

## REPORT FORM ASTM D 4318 (Method B)

Project: Norwich MGP Site  
Project No.: SE-0301  
Sample No.: Gravel Core  
Description: Dark Gray Silty Sand

Testing Date: 4/14/2009  
Tested By: JM  
Tracking Code: 5728\_AT

Liquid Limit Determination		
Pan No.	A	B
Pan Weight	0.00 g	0.00 g
Wet Soil + Pan	0.00 g	0.00 g
Dry Soil + Pan	0.00 g	0.00 g
Wt of Dry Soil, Ws	0.00 g	0.00 g
Wt of Water, Ww	0.00 g	0.00 g
Moisture Content, ASTM	#DIV/0! %	#DIV/0! %
No. of Blows, N	0	0
Correction Factor, K	1.022	1.022
<b>Liquid Limit</b>	<b>#DIV/0!</b>	<b>#DIV/0!</b>

Liquid Limit: NL  
Plastic Limit: NP  
**Plasticity Index:** NA

N	k
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022

Plastic Limit Determination		
Pan No.	C	D
Pan Weight	0.00 g	0.00 g
Wet Soil + Pan	0.00 g	0.00 g
Dry Soil + Pan	0.00 g	0.00 g
Wt of Dry Soil, Ws	0.00 g	0.00 g
Wt of Water, Ww	0.00 g	0.00 g
Moisture Content, ASTM	#DIV/0! %	#DIV/0! %
<b>Plastic Limit</b>	<b>#DIV/0! %</b>	<b>#DIV/0! %</b>

# MOISTURE CONTENT DETERMINATION

## REPORT FORM

PROJECT: Norwich MGP Site  
PROJECT No.: SE-0301  
SAMPLE No.: Gravel Core  
TESTING DATE: 04/10/09  
TESTED BY: SEM  
TRACKING CODE: 5728\_MC

MOISTURE CONTENT (Dry & Wet Basis)			
1. MOISTURE TIN NO.	A	B	C
2. WT MOISTURE TIN (tare weight)	67.07 g	88.32 g	66.14 g
3. WT WET SOIL + TARE	110.57 g	153.84 g	115.65 g
4. WT DRY SOIL + TARE	102.43 g	141.18 g	105.61 g
5. WT WATER, Ww	8.14 g	12.66 g	10.04 g
6. WT DRY SOIL, Ws	35.36 g	52.86 g	39.47 g
7. ASTM MOISTURE CONTENT	23.02 %	23.95 %	25.44 %
8. PERCENT SOLIDS	81.29 %	80.68 %	79.72 %
9. AVERAGE ASTM MOISTURE CONTENT	24.14 %		
10. AVERAGE PERCENT SOLIDS	80.56 %		

# MATERIAL pH

EPA METHOD 9045  
DATA SHEET

PROJECT: Norwich MGP Site

PROJECT No.: SE-0301

TESTING DATE: 4/10/2009

TESTED BY: SEM

TRACKING CODE: 5728\_pH

KEMRON SAMPLE No.		MATERIAL pH
1.	Gravel Core A	6.96
2.	Gravel Core B	7.08
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		
Average:		7.02

# PERMEABILITY ASTM D5084

## SPECIMEN CONDITIONS

Page 1 of 6

PROJECT: Norwich MGP Site  
 PROJECT No.: SE-0301  
 SAMPLE No.: Gravel Core  
 TEST DATE: 4/10/2009

TESTED BY: SEM  
 TRACKING CODE: 5728\_PM  
 EQUIPMENT No.: 3

<b>MOISTURE CONTENT (Dry Basis)</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>1. MOISTURE TIN NO.</b>	Gravel Core	Gravel Core
<b>2. WT MOISTURE TIN (tare weight)</b>	0.00 <b>g</b>	231.86 <b>g</b>
<b>3. WT WET SOIL + TARE</b>	553.57 <b>g</b>	783.70 <b>g</b>
<b>4. WT DRY SOIL + TARE</b>	466.64 <b>g</b>	698.50 <b>g</b>
5. WT WATER, W <sub>w</sub>	86.93 <b>g</b>	85.20 <b>g</b>
6. WT DRY SOIL, W <sub>s</sub>	466.64 <b>g</b>	466.64 <b>g</b>
7. MOISTURE CONTENT, W	18.63 <b>%</b>	18.26 <b>%</b>

<b>SOIL SPECIMEN DIMENSIONS</b>				
<b>TRIPLICATE</b>	<b>DIAMETER</b>		<b>HEIGHT</b>	
<b>ANALYSES</b>	<b>INITIAL</b>	<b>FINAL</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>No. 1</b>	2.86 in.	2.86 in.	2.48 in.	2.48 in.
<b>No. 2</b>	2.86 in.	2.86 in.	2.51 in.	2.50 in.
<b>No. 3</b>	2.86 in.	2.86 in.	2.52 in.	2.52 in.
Average	2.86 in.	2.86 in.	2.50 in.	2.50 in.

<b>SPECIMEN CONDITIONS</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>Specimen WT, W<sub>o</sub></b>	553.57 <b>g</b>	552.80 <b>g</b>
Area, A <sub>o</sub>	6.42 in <sup>2</sup>	6.42 in <sup>2</sup>
Volume, V <sub>o</sub>	16.08 in <sup>3</sup>	16.06 in <sup>3</sup>
Bulk Unit Weight	131.1 lb/ft <sup>3</sup>	131.1 lb/ft <sup>3</sup>
Dry Unit Weight	110.5 lb/ft <sup>3</sup>	110.9 lb/ft <sup>3</sup>

## BACK-PRESSURE SATURATION

TESTED BY:	SEM
TRACKING CODE:	5728_PM
EQUIPMENT No.:	3

\* Saturation check - no data available.

## SPECIMEN CONSOLIDATION

PROJECT:	Norwich MGP Site
PROJECT No.:	SE-0301
SAMPLE No.:	Gravel Core
TEST DATE:	4/10/2009

SEM  
5728\_PM  
3

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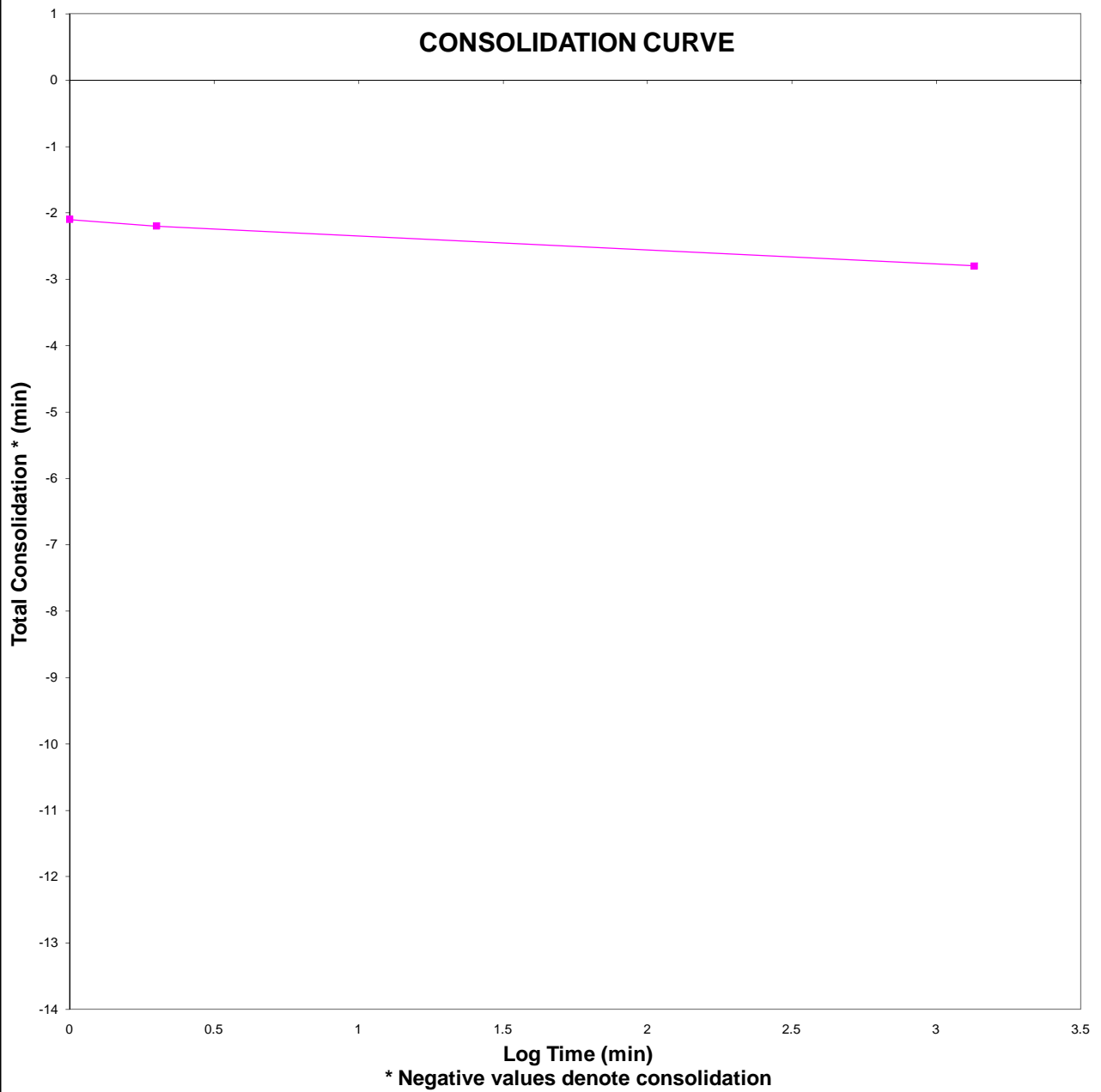
# PERMEABILITY ASTM D5084

## CONSOLIDATION CURVE

Page 4 of 6

PROJECT: Norwich MGP Site  
PROJECT No.: SE-0301  
SAMPLE No.: Gravel Core  
TEST DATE: 4/10/2009

TESTED BY: SEM  
TRACKING CODE: 5728\_PM  
EQUIPMENT No.: 3



## PERMEABILITY ASTM D5084

## TEST DATA

Page 5 of 6

PROJECT:	Norwich MGP Site
PROJECT No.:	SE-0301
SAMPLE No.:	Gravel Core
TEST DATE:	4/10/2009

TESTED BY:	SEM
TRACKING CODE:	5728_PM
EQUIPMENT No.:	3

[illegible]



**TEST DATA (continued)**

Page 6 of 6

TESTED BY:	SEM
TRACKING CODE:	5728_PM
EQUIPMENT No.:	3

[illegible]

# PERMEABILITY ASTM D5084

## SUMMARY OF RESULTS

PROJECT: Norwich MGP Site  
PROJECT No.: SE-0301  
SAMPLE No.: Gravel Core  
TEST DATE: 4/10/2009

TESTED BY: SEM  
TRACKING CODE: 5728\_PM  
EQUIPMENT No.: 3

TESTING PARAMETER	INITIAL	FINAL
BULK UNIT WEIGHT	131.1 lb/ft <sup>3</sup>	131.1 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	110.5 lb/ft <sup>3</sup>	110.9 lb/ft <sup>3</sup>
MOISTURE CONTENT	18.6 %	18.3 %
PERMEABILITY @ 20°C	8.1E-05 cm/sec	

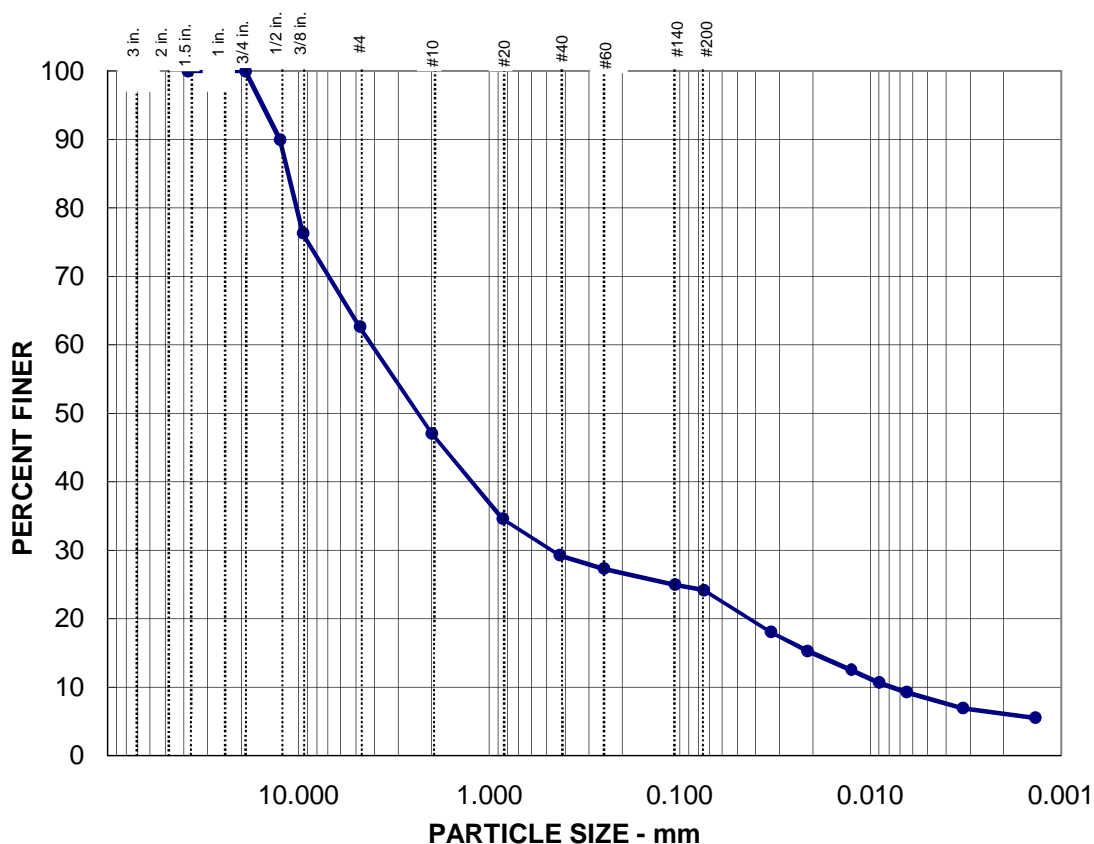
# UNIT WEIGHT DETERMINATION

## DATA SHEET

PROJECT: Norwich MGP Site  
PROJECT No.: SE-0301  
SAMPLE No.: Gravel Core  
TESTING DATE: 04/10/09  
TESTED BY: SEM  
TRACKING CODE: 5728\_UW

UNIT WEIGHT (DENSITY)			
1. SAMPLE NO.	Top	Mid	Bottom
2. WT OF MOLD (tare weight)	408.74 g	254.63	251.21
3. WT OF MOLD + SOIL	1126.20 g	1202.70	1079.60
4. WT OF WET SOIL, W	717.46 g	948.07	828.39
5. DIAMETER OF SPECIMEN, D	2.86 in	2.86	2.86
6. HEIGHT OF SPECIMEN, H	3.86 in	4.80	4.09
7. VOLUME OF SPECIMEN	24.80 in <sup>3</sup>	30.84	26.28
8. BULK UNIT WEIGHT	110.2 pcf	117.1	120.1
9. BULK SPECIFIC GRAVITY	1.8	1.9	1.9
10. AVERAGE BULK UNIT WEIGHT	115.8 pcf		
11. AVERAGE BULK SPECIFIC GRAVITY	1.9		

## PARTICLE SIZE DISTRIBUTION TEST REPORT



% GRAVEL	% SAND	% SILT	% CLAY
37.3	38.5	15.8	8.4

SAMPLE INFORMATION	
Project Name:	Norwich MGP Site
Project Number:	SE-0301
Sample ID:	Fill Core
Sample Description:	Brown Silty, Clayey Sand with Gravel
Testing Date:	04/10/09

**KEMRON**  
ENVIRONMENTAL SERVICES

SAMPLE CLASSIFICATION	
Liquid Limit:	22
Plastic Limit:	16
Plasticity Index:	6
USCS Classification	
Classification	SC-SM
AASHTO Classification	
Classification	A-2-4
Group Index	
DESCRIPTION:	
Silty, Clayey Sand with Gravel	

# PARTICLE SIZE DISTRIBUTION DATA REPORT

REPORT FORM  
ASTM D422

PROJECT: Norwich MGP Site  
PROJECT No.: SE-0301  
SAMPLE No.: Fill Core  
SAMPLE DESCRIPT: Brown Silty, Clayey Sand with Gravel  
TESTING DATE: 04/10/09  
TESTED BY: SEM  
TRACKING CODE: 5729\_GR

MOISTURE CONTENT (DRY AND WET BASIS)	
TARE WEIGHT	205.33 g
WT WET SOIL + TARE	317.29 g
WT DRY SOIL + TARE	311.71 g
WT WATER, Ww	5.58 g
WT DRY SOIL, Ws	106.38 g
ASTM MOISTURE	5.25 %
EPA MOISTURE	4.98 %

SIEVE NUMBER	PERCENT PASSING
1.5	100.0 %
1.0	100.0 %
0.75	100.0 %
0.5	90.0 %
0.375	76.3 %
#4	62.7 %
#10	47.1 %
#20	34.6 %
#40	29.3 %
#60	27.4 %
#140	25.0 %
#200	24.2 %

HYDROMETER ANALYSIS	
HYDROMETER No.	3
Wt OF DRY SOIL, Ws	25.73
DATE TESTING INITIATED	04/15/09
TIME TESTING INITIATED	12:02:00 PM

ELAPSED TIME (minutes)	ACTUAL READING	CORRECTED READING	DIAMETER (mm)	PERCENT FINER (%)
2	25.0	19.5	0.0332	18.1
5	22.0	16.5	0.0214	15.3
15	19.0	13.5	0.0126	12.5
30	17.0	11.5	0.0090	10.7
60	15.5	10.0	0.0064	9.3
240	13.0	7.5	0.0033	6.9
1400	11.5	6.0	0.0014	5.5

**Kemron**  
ENVIRONMENTAL SERVICES

# ATTERBERG LIMITS

## REPORT FORM ASTM D 4318 (Method B)

Project: Norwich MGP Site  
Project No.: SE-0301  
Sample No.: Fill Core  
Description: Brown Silty, Clayey Sand with Gravel

Testing Date: 4/16/2009  
Tested By: JM  
Tracking Code: 5729\_AT

Liquid Limit Determination		
Pan No.	A	B
Pan Weight	1.09 g	1.09 g
Wet Soil + Pan	5.49 g	7.45 g
Dry Soil + Pan	4.68 g	6.29 g
Wt of Dry Soil, Ws	3.59 g	5.21 g
Wt of Water, Ww	0.80 g	1.16 g
Moisture Content, ASTM	22.40 %	22.22 %
No. of Blows, N	22	21
Correction Factor, K	0.985	0.979
<b>Liquid Limit</b>	<b>22</b>	<b>22</b>

Liquid Limit: 22  
Plastic Limit: 16  
**Plasticity Index:** 6

N	k
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022

Plastic Limit Determination		
Pan No.	C	D
Pan Weight	1.10 g	1.07 g
Wet Soil + Pan	1.88 g	2.02 g
Dry Soil + Pan	1.77 g	1.89 g
Wt of Dry Soil, Ws	0.67 g	0.82 g
Wt of Water, Ww	0.11 g	0.13 g
Moisture Content, ASTM	16.66 %	16.26 %
<b>Plastic Limit</b>	<b>17 %</b>	<b>16 %</b>

# MOISTURE CONTENT DETERMINATION

## REPORT FORM

PROJECT: Norwich MGP Site  
PROJECT No.: SE-0301  
SAMPLE No.: Fill Core  
TESTING DATE: 04/10/09  
TESTED BY: SEM  
TRACKING CODE: 5729\_MC

MOISTURE CONTENT (Dry & Wet Basis)			
1. MOISTURE TIN NO.	A	B	C
2. WT MOISTURE TIN (tare weight)	84.81 g	66.07 g	69.42 g
3. WT WET SOIL + TARE	123.66 g	116.71 g	102.46 g
4. WT DRY SOIL + TARE	121.55 g	113.92 g	100.45 g
5. WT WATER, Ww	2.11 g	2.79 g	2.01 g
6. WT DRY SOIL, Ws	36.74 g	47.85 g	31.03 g
7. ASTM MOISTURE CONTENT	5.74 %	5.83 %	6.48 %
8. PERCENT SOLIDS	94.57 %	94.49 %	93.92 %
9. AVERAGE ASTM MOISTURE CONTENT	6.02 %		
10. AVERAGE PERCENT SOLIDS	94.33 %		

# MATERIAL pH

EPA METHOD 9045  
DATA SHEET

PROJECT: Norwich MGP Site

PROJECT No.: SE-0301

TESTING DATE: 4/10/2009

TESTED BY: SEM

TRACKING CODE: 5729\_pH

KEMRON SAMPLE No.		MATERIAL pH
1.	Fill Core A	7.87
2.	Fill Core B	8.06
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		
Average:		7.97



# Constant Head Permeability Test

## Determination of Coefficient of Permeability

### ASTM D 2434

Project Name: Norwich MGP

Project No.: SE0301

Testing Date: 4/15/2009

Tested By: HH

Tracking Code: 5729\_PM

Sample ID	Fill Core	1	2	3
Average Flow, Q (cm <sup>3</sup> )		3.60	3.60	3.60
Time of Collection, t (s)		120.00	120.00	120.00
Temperature of water, T (°C)		21.00	21.00	21.00
Head difference, h (cm)		122.834	122.834	122.834
Diameter of specimen, D (cm)		5.08	5.08	5.08
Length of specimen, L (cm)		8.316	8.316	8.316
Area of specimen, A= $\pi/4 \cdot D^2$ (cm <sup>2</sup> )		20.258	20.258	20.258
k=QL/Aht (cm/s)		0.0001002582	0.0001002582	0.0001002582
Average K= <u>0.0001002582</u> cm/s				
$k_{20}^{\circ C} = k_T^{\circ C} (\eta_T^{\circ C} / \eta_{20}^{\circ C})$				
<div style="display: flex; justify-content: space-between; align-items: center;"> <span>=</span> <span><u>9.7852E-05</u></span> </div>				

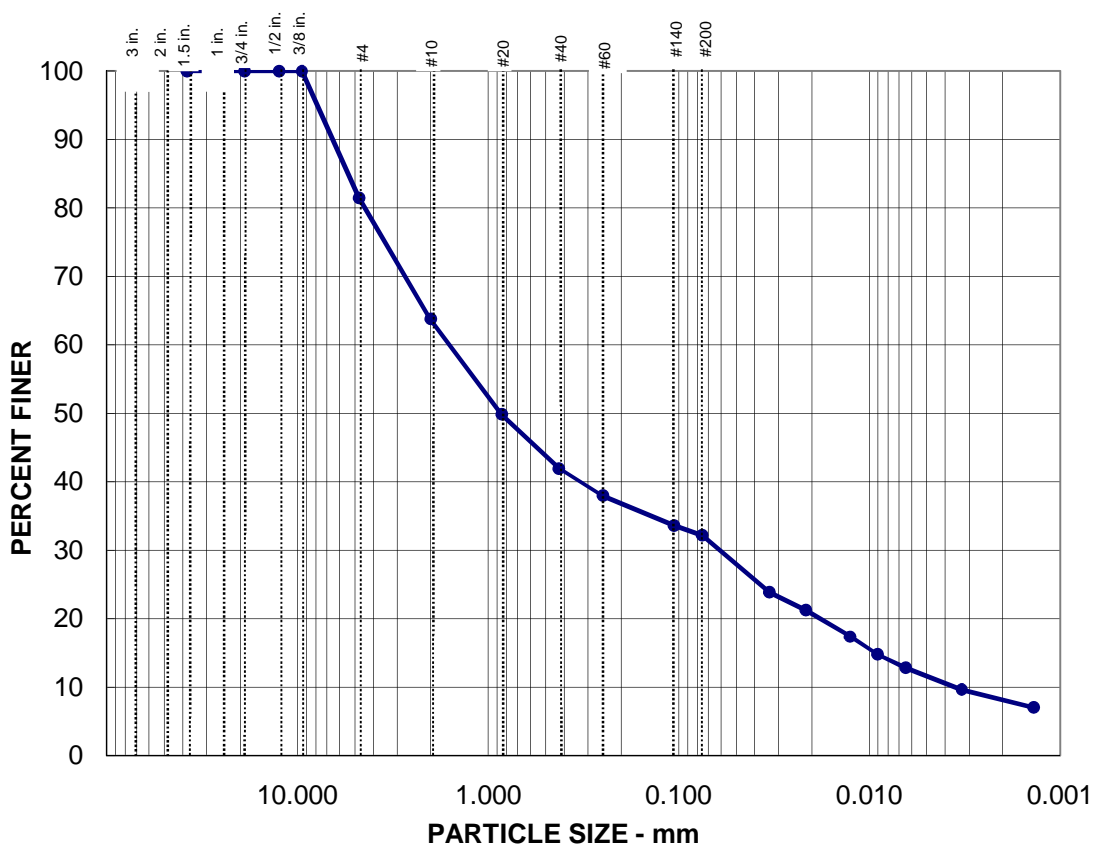
# UNIT WEIGHT DETERMINATION

## DATA SHEET

PROJECT: \_\_\_\_\_ Norwich MGP Site  
PROJECT No.: \_\_\_\_\_ SE-0301  
SAMPLE No.: \_\_\_\_\_ Fill Core  
TESTING DATE: \_\_\_\_\_ 4/10/2009  
TESTED BY: \_\_\_\_\_ SEM  
TRACKING CODE: \_\_\_\_\_ 5729\_UW

UNIT WEIGHT (DENSITY)	
1. SAMPLE NO.	Fill Core
2. WT OF MOLD (tare weight)	0.00 g
3. WT OF MOLD + SOIL	1344.61 g
4. WT OF WET SOIL, W	1344.61 g
5. DIAMETER OF SPECIMEN, D	1.64 in
6. HEIGHT OF SPECIMEN, H	20.75 in
7. VOLUME OF SPECIMEN	43.83 in <sup>3</sup>
8. BULK UNIT WEIGHT	116.9 pcf
9. BULK SPECIFIC GRAVITY	1.9

## PARTICLE SIZE DISTRIBUTION TEST REPORT



% GRAVEL	% SAND	% SILT	% CLAY
18.5	49.3	20.5	11.7

SAMPLE INFORMATION	
Project Name:	Norwich MGP Site
Project Number:	SE0301
Sample ID:	Fill Composite
Sample Description:	Dark Brown Clayey Sand with gravel
Testing Date:	04/08/09

**KEMRON**  
ENVIRONMENTAL SERVICES

SAMPLE CLASSIFICATION	
Liquid Limit:	31
Plastic Limit:	22
Plasticity Index:	9
USCS Classification	
Classification	SC
AASHTO Classification	
Classification	A-2-4
Group Index	
DESCRIPTION:	
Clayey Sand with Gravel	

# PARTICLE SIZE DISTRIBUTION DATA REPORT

REPORT FORM  
ASTM D422

PROJECT: Norwich MGP Site  
PROJECT No.: SE0301  
SAMPLE No.: Fill Composite  
SAMPLE DESCRIPT: Dark Brown Clayey Sand with gravel  
TESTING DATE: 04/08/09  
TESTED BY: JS  
TRACKING CODE: 5734\_GR

MOISTURE CONTENT (DRY AND WET BASIS)	
TARE WEIGHT	150.22 g
WT WET SOIL + TARE	236.12 g
WT DRY SOIL + TARE	226.82 g
WT WATER, Ww	9.30 g
WT DRY SOIL, Ws	76.60 g
ASTM MOISTURE	12.14 %
EPA MOISTURE	10.83 %

SIEVE NUMBER	PERCENT PASSING
1.5	100.0 %
1.0	100.0 %
0.75	100.0 %
0.5	100.0 %
0.375	100.0 %
#4	81.5 %
#10	63.8 %
#20	49.9 %
#40	42.0 %
#60	38.0 %
#140	33.7 %
#200	32.2 %

HYDROMETER ANALYSIS	
HYDROMETER No.	5
Wt OF DRY SOIL, Ws	24.66
DATE TESTING INITIATED	04/15/09
TIME TESTING INITIATED	12:04:00 PM

ELAPSED TIME (minutes)	ACTUAL READING	CORRECTED READING	DIAMETER (mm)	PERCENT FINER (%)
2	24.0	18.5	0.0334	23.9
5	22.0	16.5	0.0214	21.3
15	19.0	13.5	0.0126	17.4
30	17.0	11.5	0.0090	14.8
60	15.5	10.0	0.0064	12.9
240	13.0	7.5	0.0033	9.6
1400	11.0	5.5	0.0014	7.1

**Kemron**  
ENVIRONMENTAL SERVICES

# ATTERBERG LIMITS

## REPORT FORM ASTM D 4318 (Method B)

Project: Norwich MGP Site  
Project No.: SE-0301  
Sample No.: Fill Composite  
Description: Dark Brown Clayey Sand w/ Gravel

Testing Date: 4/14/2009  
Tested By: JM  
Tracking Code: 5734\_AT

Liquid Limit Determination		
Pan No.	A	B
Pan Weight	1.13 g	1.08 g
Wet Soil + Pan	4.96 g	6.62 g
Dry Soil + Pan	4.04 g	5.29 g
Wt of Dry Soil, Ws	2.91 g	4.22 g
Wt of Water, Ww	0.92 g	1.33 g
Moisture Content, ASTM	31.44 %	31.53 %
No. of Blows, N	21	22
Correction Factor, K	0.979	0.985
<b>Liquid Limit</b>	<b>31</b>	<b>31</b>

Liquid Limit: 31  
Plastic Limit: 22  
**Plasticity Index:** 9

N	k
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022

Plastic Limit Determination		
Pan No.	C	D
Pan Weight	1.09 g	1.09 g
Wet Soil + Pan	2.77 g	2.25 g
Dry Soil + Pan	2.46 g	2.05 g
Wt of Dry Soil, Ws	1.38 g	0.96 g
Wt of Water, Ww	0.30 g	0.21 g
Moisture Content, ASTM	22.12 %	21.68 %
<b>Plastic Limit</b>	<b>22 %</b>	<b>22 %</b>

# MOISTURE CONTENT DETERMINATION

## REPORT FORM

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: Fill Composite  
TESTING DATE: 04/10/09  
TESTED BY: JS  
TRACKING CODE: 5734-MC

MOISTURE CONTENT (Dry & Wet Basis)			
1. MOISTURE TIN NO.	A	B	C
2. WT MOISTURE TIN (tare weight)	1.09 g	1.09 g	1.10 g
3. WT WET SOIL + TARE	21.64 g	22.24 g	22.35 g
4. WT DRY SOIL + TARE	19.43 g	20.02 g	19.84 g
5. WT WATER, Ww	2.21 g	2.22 g	2.51 g
6. WT DRY SOIL, Ws	18.34 g	18.93 g	18.74 g
7. ASTM MOISTURE CONTENT	12.05 %	11.73 %	13.39 %
8. PERCENT SOLIDS	89.25 %	89.50 %	88.19 %
9. AVERAGE ASTM MOISTURE CONTENT	12.39 %		
10. AVERAGE PERCENT SOLIDS	88.98 %		

# MATERIAL pH

EPA METHOD 9045  
DATA SHEET

PROJECT: Norwich MGP Site

PROJECT No.: SE-0301

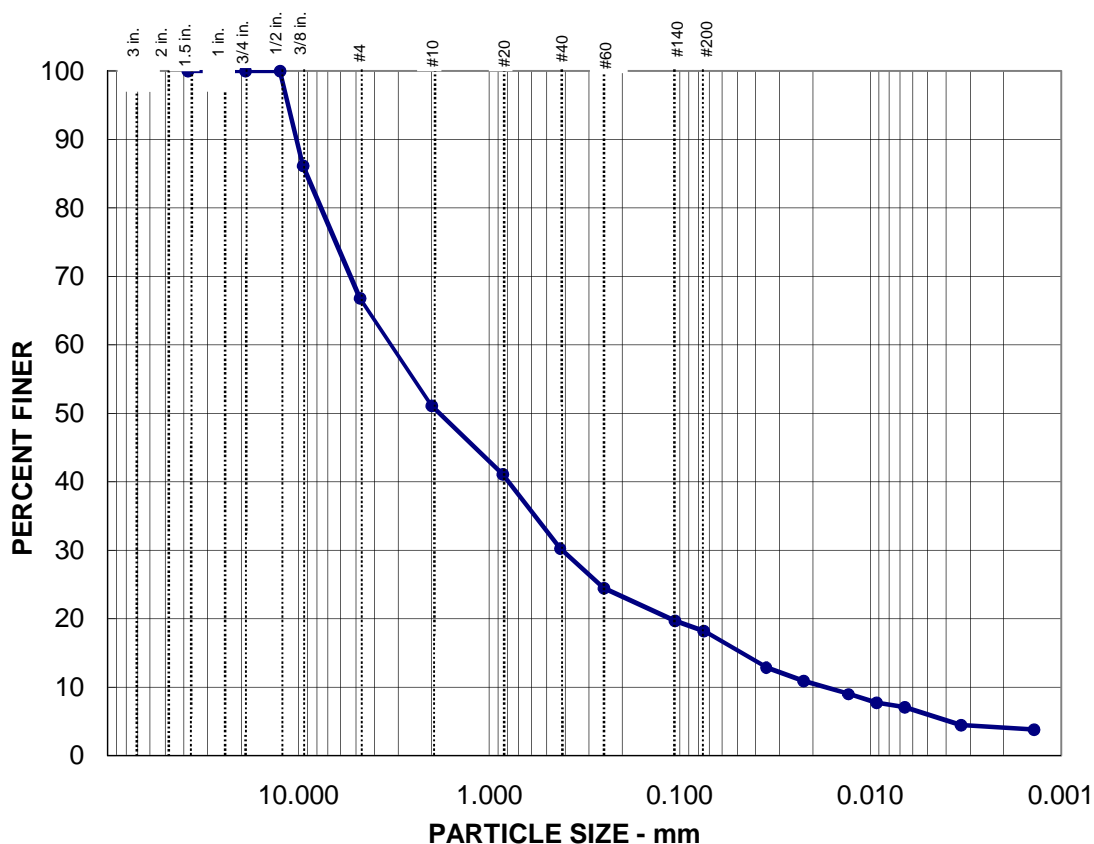
TESTING DATE: 4/8/2009

TESTED BY: JH/JS

TRACKING CODE: 5734\_pH

KEMRON SAMPLE No.		MATERIAL pH
1.	Fill Composite A	7.72
2.	Fill Composite B	7.99
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		
Average:		7.86

## PARTICLE SIZE DISTRIBUTION TEST REPORT



% GRAVEL	% SAND	% SILT	% CLAY
33.2	48.6	12.2	6.0

SAMPLE INFORMATION	
Project Name:	Norwich MGP Site
Project Number:	SE0301
Sample ID:	Gravel Composite
Sample Description:	Brown Silty Sand with Gravel
Testing Date:	04/08/09

**KEMRON**  
ENVIRONMENTAL SERVICES

SAMPLE CLASSIFICATION	
Liquid Limit:	22
Plastic Limit:	19
Plasticity Index:	3
USCS Classification	
Classification	SM
AASHTO Classification	
Classification	A-2-4
Group Index	
DESCRIPTION:	
Silty Sand with Gravel	



# PARTICLE SIZE DISTRIBUTION DATA REPORT

REPORT FORM  
ASTM D422

PROJECT: \_\_\_\_\_ Norwich MGP Site  
PROJECT No.: \_\_\_\_\_ SE0301  
SAMPLE No.: \_\_\_\_\_ Gravel Composite  
SAMPLE DESCRIPT: \_\_\_\_\_ Brown Silty Sand with Gravel  
TESTING DATE: \_\_\_\_\_ 04/08/09  
TESTED BY: \_\_\_\_\_ JS  
TRACKING CODE: \_\_\_\_\_ 5735\_GR

MOISTURE CONTENT (DRY AND WET BASIS)	
TARE WEIGHT	204.95 g
WT WET SOIL + TARE	290.79 g
WT DRY SOIL + TARE	281.28 g
WT WATER, Ww	9.51 g
WT DRY SOIL, Ws	76.33 g
ASTM MOISTURE	12.46 %
EPA MOISTURE	11.08 %

SIEVE NUMBER	PERCENT PASSING
1.5	100.0 %
1.0	100.0 %
0.75	100.0 %
0.5	100.0 %
0.375	86.2 %
#4	66.8 %
#10	51.1 %
#20	41.1 %
#40	30.3 %
#60	24.5 %
#140	19.7 %
#200	18.2 %

HYDROMETER ANALYSIS	
HYDROMETER No.	6
Wt OF DRY SOIL, Ws	13.89
DATE TESTING INITIATED	04/15/09
TIME TESTING INITIATED	12:05:00 PM

ELAPSED TIME (minutes)	ACTUAL READING	CORRECTED READING	DIAMETER (mm)	PERCENT FINER (%)
2	15.5	10.0	0.0353	12.9
5	14.0	8.5	0.0225	11.0
15	12.5	7.0	0.0131	9.0
30	11.5	6.0	0.0093	7.7
60	11.0	5.5	0.0066	7.1
240	9.0	3.5	0.0033	4.5
1400	8.5	3.0	0.0014	3.8

**Kemron**  
ENVIRONMENTAL SERVICES

# ATTERBERG LIMITS

## REPORT FORM ASTM D 4318 (Method B)

Project: Norwich MGP Site  
Project No.: SE-0301  
Sample No.: Gravel Composite  
Description: Brown Silty Sand with Gravel

Testing Date: 4/14/2009  
Tested By: JM  
Tracking Code: 5735\_AT

Liquid Limit Determination		
Pan No.	A	B
Pan Weight	1.06 g	1.08 g
Wet Soil + Pan	9.38 g	5.22 g
Dry Soil + Pan	7.82 g	4.46 g
Wt of Dry Soil, Ws	6.76 g	3.38 g
Wt of Water, Ww	1.56 g	0.76 g
Moisture Content, ASTM	23.03 %	22.59 %
No. of Blows, N	22	21
Correction Factor, K	0.985	0.979
<b>Liquid Limit</b>	<b>23</b>	<b>22</b>

Liquid Limit: 22  
Plastic Limit: 19  
**Plasticity Index:** 3

N	k
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022

Plastic Limit Determination		
Pan No.	C	D
Pan Weight	1.09 g	1.09 g
Wet Soil + Pan	2.60 g	2.45 g
Dry Soil + Pan	2.36 g	2.23 g
Wt of Dry Soil, Ws	1.27 g	1.14 g
Wt of Water, Ww	0.24 g	0.22 g
Moisture Content, ASTM	18.62 %	19.13 %
<b>Plastic Limit</b>	<b>19 %</b>	<b>19 %</b>

# MOISTURE CONTENT DETERMINATION

## REPORT FORM

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: Gravel Composite  
TESTING DATE: 04/08/09  
TESTED BY: JH  
TRACKING CODE: 5735-MC

MOISTURE CONTENT (Dry & Wet Basis)			
1. MOISTURE TIN NO.	A	B	C
2. WT MOISTURE TIN (tare weight)	1.10 g	1.10 g	1.14 g
3. WT WET SOIL + TARE	31.71 g	21.05 g	19.42 g
4. WT DRY SOIL + TARE	28.11 g	18.68 g	17.09 g
5. WT WATER, Ww	3.60 g	2.37 g	2.33 g
6. WT DRY SOIL, Ws	27.01 g	17.58 g	15.95 g
7. ASTM MOISTURE CONTENT	13.33 %	13.48 %	14.61 %
8. PERCENT SOLIDS	88.24 %	88.12 %	87.25 %
9. AVERAGE ASTM MOISTURE CONTENT	13.81 %		
10. AVERAGE PERCENT SOLIDS	87.87 %		

# MATERIAL pH

EPA METHOD 9045  
DATA SHEET

PROJECT: Norwich MGP Site

PROJECT No.: SE-0301

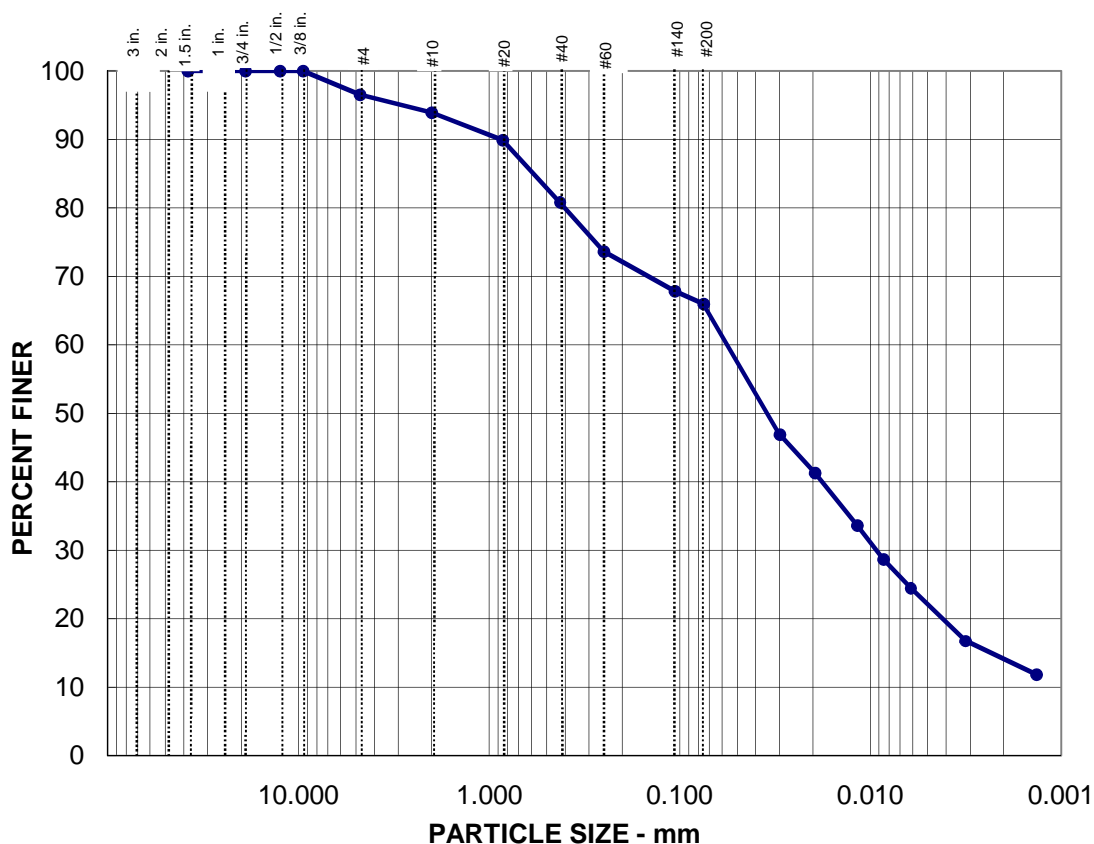
TESTING DATE: 4/8/2009

TESTED BY: JH

TRACKING CODE: 5735\_pH

KEMRON SAMPLE No.		MATERIAL pH
1.	Gravel Composite A	8.06
2.	Gravel Composite B	8.30
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		
Average:		8.18

## PARTICLE SIZE DISTRIBUTION TEST REPORT



% GRAVEL	% SAND	% SILT	% CLAY
3.5	30.6	43.8	22.1

SAMPLE INFORMATION	
Project Name:	Norwich MGP Site
Project Number:	SE-0301
Sample ID:	Sand/Silt Composite
Sample Description:	Brown Sandy, Silty, Clay
Testing Date:	04/08/09

**KEMRON**  
ENVIRONMENTAL SERVICES

SAMPLE CLASSIFICATION	
Liquid Limit:	26
Plastic Limit:	21
Plasticity Index:	5
USCS Classification	
Classification	CL-ML
AASHTO Classification	
Classification	A-4
Group Index	
DESCRIPTION:	
Sandy Silty Clay	

# PARTICLE SIZE DISTRIBUTION DATA REPORT

REPORT FORM  
ASTM D422

PROJECT: Norwich MGP Site  
PROJECT No.: SE-0301  
SAMPLE No.: Sand/Silt Composite  
SAMPLE DESCRIPT: Brown Sandy, Silty, Clay  
TESTING DATE: 04/08/09  
TESTED BY: JS  
TRACKING CODE: 5736\_GR

MOISTURE CONTENT (DRY AND WET BASIS)	
TARE WEIGHT	206.61 g
WT WET SOIL + TARE	293.12 g
WT DRY SOIL + TARE	277.17 g
WT WATER, Ww	15.95 g
WT DRY SOIL, Ws	70.56 g
ASTM MOISTURE	22.60 %
EPA MOISTURE	18.44 %

SIEVE NUMBER	PERCENT PASSING
1.5	100.0 %
1.0	100.0 %
0.75	100.0 %
0.5	100.0 %
0.375	100.0 %
#4	96.5 %
#10	93.9 %
#20	89.9 %
#40	80.9 %
#60	73.7 %
#140	67.9 %
#200	66.0 %

HYDROMETER ANALYSIS	
HYDROMETER No.	4
Wt OF DRY SOIL, Ws	46.54
DATE TESTING INITIATED	04/15/09
TIME TESTING INITIATED	12:03:00 PM

ELAPSED TIME (minutes)	ACTUAL READING	CORRECTED READING	DIAMETER (mm)	PERCENT FINER (%)
2	39.0	33.5	0.0299	46.9
5	35.0	29.5	0.0195	41.3
15	29.5	24.0	0.0118	33.6
30	26.0	20.5	0.0085	28.7
60	23.0	17.5	0.0061	24.5
240	17.5	12.0	0.0032	16.8
1400	14.0	8.5	0.0013	11.9

**Kemron**  
ENVIRONMENTAL SERVICES

# ATTERBERG LIMITS

## REPORT FORM ASTM D 4318 (Method B)

Project: Norwich MGP Site  
Project No.: SE-0301  
Sample No.: Sand/Silt Composite  
Description: Brown Sandy, Silty, Clay

Testing Date: 4/14/2009  
Tested By: JM  
Tracking Code: 5736\_AT

Liquid Limit Determination		
Pan No.	A	B
Pan Weight	1.10 g	1.07 g
Wet Soil + Pan	7.47 g	9.83 g
Dry Soil + Pan	6.21 g	7.90 g
Wt of Dry Soil, Ws	5.11 g	6.83 g
Wt of Water, Ww	1.26 g	1.93 g
Moisture Content, ASTM	24.74 %	28.20 %
No. of Blows, N	22	21
Correction Factor, K	0.985	0.979
<b>Liquid Limit</b>	<b>24</b>	<b>28</b>

Liquid Limit: 26

Plastic Limit: 21

**Plasticity Index:** 5

N	k
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022

Plastic Limit Determination		
Pan No.	C	D
Pan Weight	1.07 g	1.07 g
Wet Soil + Pan	2.37 g	2.37 g
Dry Soil + Pan	2.15 g	2.15 g
Wt of Dry Soil, Ws	1.07 g	1.07 g
Wt of Water, Ww	0.23 g	0.23 g
Moisture Content, ASTM	21.03 %	20.99 %
<b>Plastic Limit</b>	<b>21 %</b>	<b>21 %</b>

# MOISTURE CONTENT DETERMINATION

## REPORT FORM

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: Sand/Silt Composite  
TESTING DATE: 04/08/09  
TESTED BY: JH/JS  
TRACKING CODE: 5736-MC

MOISTURE CONTENT (Dry & Wet Basis)			
1. MOISTURE TIN NO.	A	B	C
2. WT MOISTURE TIN (tare weight)	71.93 g	69.78 g	53.12 g
3. WT WET SOIL + TARE	112.61 g	108.02 g	96.30 g
4. WT DRY SOIL + TARE	104.90 g	100.72 g	88.35 g
5. WT WATER, Ww	7.71 g	7.30 g	7.95 g
6. WT DRY SOIL, Ws	32.97 g	30.94 g	35.23 g
7. ASTM MOISTURE CONTENT	23.38 %	23.59 %	22.57 %
8. PERCENT SOLIDS	81.05 %	80.91 %	81.59 %
9. AVERAGE ASTM MOISTURE CONTENT	23.18 %		
10. AVERAGE PERCENT SOLIDS	81.18 %		



# MATERIAL pH

EPA METHOD 9045  
DATA SHEET

PROJECT: Norwich MGP Site

PROJECT No.: SE-0301

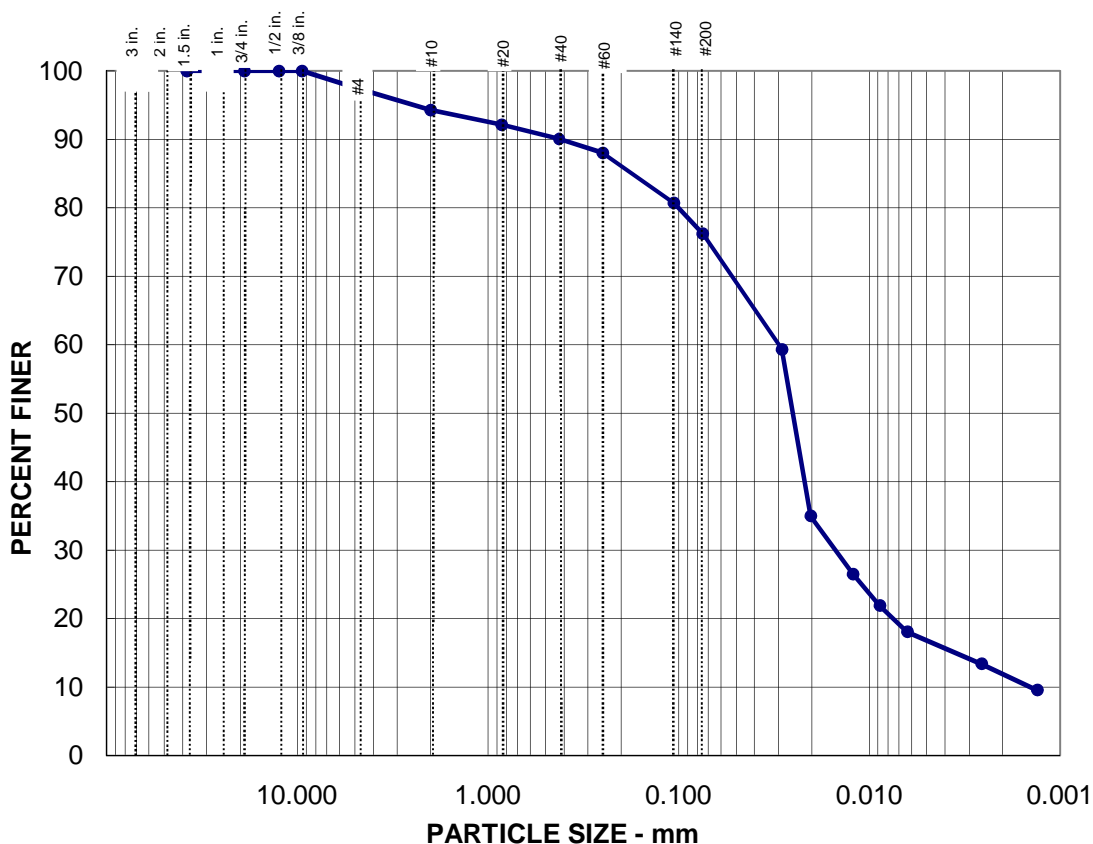
TESTING DATE: 4/8/2009

TESTED BY: JH/JS

TRACKING CODE: 5736\_pH

KEMRON SAMPLE No.		MATERIAL pH
1.	Sand / Silt Composite A	7.46
2.	Sand / Silt Composite B	7.45
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		
Average:		7.46

## PARTICLE SIZE DISTRIBUTION TEST REPORT



% GRAVEL	% SAND	% SILT	% CLAY
2.6	21.2	59.4	16.8

SAMPLE INFORMATION	
Project Name:	Norwich MGP Site
Project Number:	SE-0301
Sample ID:	ISS2 Sand (4-5)
Sample Description:	Dark Brown Silt with Sand
Testing Date:	04/10/09

**KEMRON**  
ENVIRONMENTAL SERVICES

SAMPLE CLASSIFICATION	
Liquid Limit:	
Plastic Limit:	
Plasticity Index:	NA
USCS Classification	
Classification	ML
AASHTO Classification	
Classification	A-4
Group Index	
DESCRIPTION:	
Silt with Sand	

# PARTICLE SIZE DISTRIBUTION DATA REPORT

REPORT FORM  
ASTM D422

PROJECT: \_\_\_\_\_ Norwich MGP Site  
PROJECT No.: \_\_\_\_\_ SE-0301  
SAMPLE No.: \_\_\_\_\_ ISS2 Sand (4-5)  
SAMPLE DESCRIPT: \_\_\_\_\_ Dark Brown Silt with Sand  
TESTING DATE: \_\_\_\_\_ 04/10/09  
TESTED BY: \_\_\_\_\_ KG  
TRACKING CODE: \_\_\_\_\_ 5725-GR

MOISTURE CONTENT (DRY AND WET BASIS)	
TARE WEIGHT	219.63 g
WT WET SOIL + TARE	299.33 g
WT DRY SOIL + TARE	283.79 g
WT WATER, Ww	15.54 g
WT DRY SOIL, Ws	64.16 g
ASTM MOISTURE	24.22 %
EPA MOISTURE	19.50 %

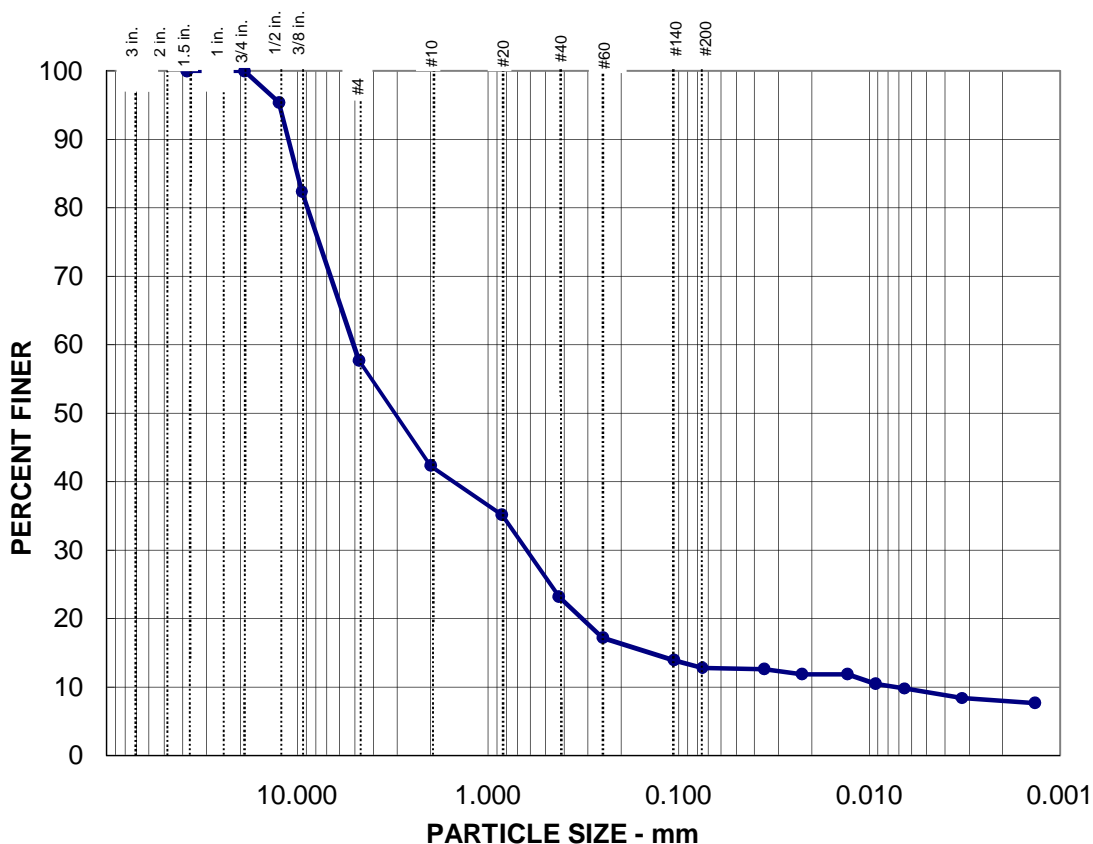
SIEVE NUMBER	PERCENT PASSING
1.5	100.0 %
1.0	100.0 %
0.75	100.0 %
0.5	100.0 %
0.375	100.0 %
#4	97.4 %
#10	94.3 %
#20	92.2 %
#40	90.1 %
#60	88.0 %
#140	80.7 %
#200	76.3 %

HYDROMETER ANALYSIS	
HYDROMETER No.	6
Wt OF DRY SOIL, Ws	48.93
DATE TESTING INITIATED	04/14/09
TIME TESTING INITIATED	5:02:00 AM

ELAPSED TIME (minutes)	ACTUAL READING	CORRECTED READING	DIAMETER (mm)	PERCENT FINER (%)
2	44.0	38.5	0.0286	59.3
5	28.0	22.7	0.0203	35.0
15	22.5	17.2	0.0122	26.5
30	19.5	14.2	0.0088	21.9
60	17.0	11.7	0.0063	18.0
372	14.0	8.7	0.0026	13.4
1475	11.5	6.2	0.0013	9.5

**Kemron**  
ENVIRONMENTAL SERVICES

## PARTICLE SIZE DISTRIBUTION TEST REPORT



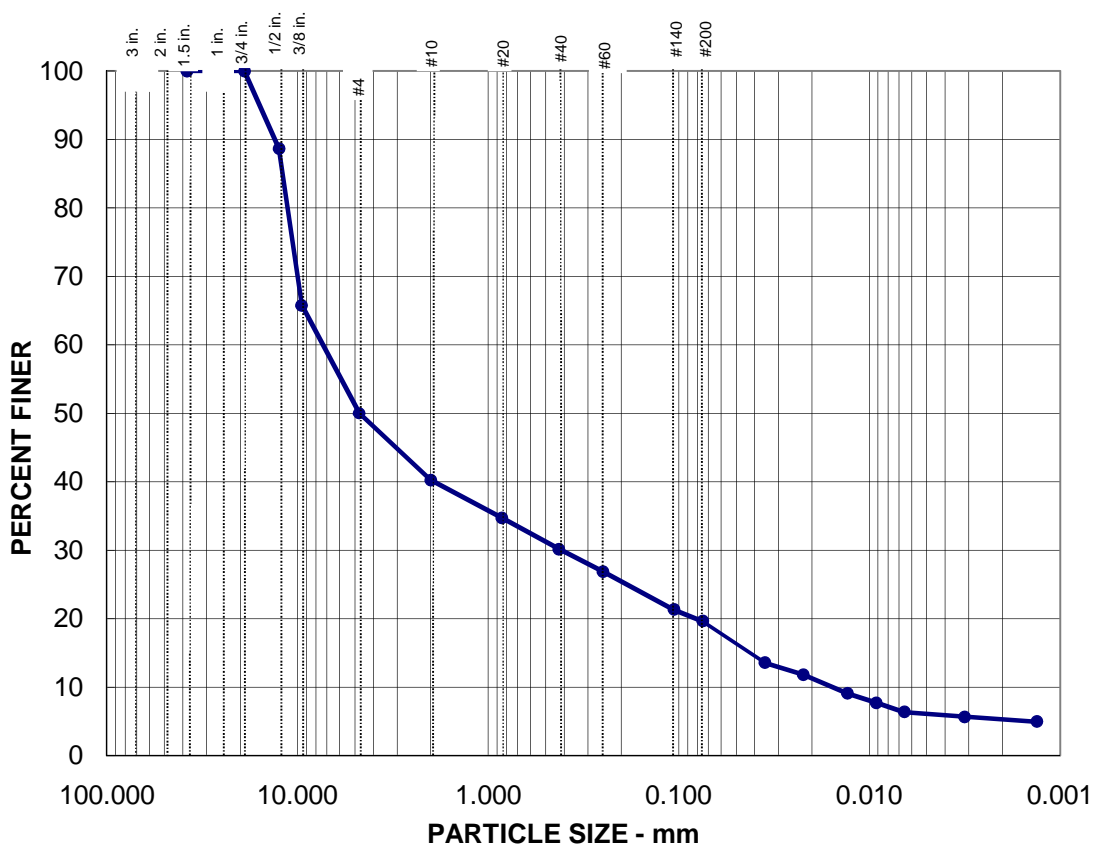
% GRAVEL	% SAND	% SILT	% CLAY
42.3	44.9	3.6	9.2

SAMPLE INFORMATION	
Project Name:	Norwich MGP Site
Project Number:	SE0301
Sample ID:	ISS2 Gravel Top (5-6)
Sample Description:	Dark Brown Silty Sand with Gravel
Testing Date:	04/10/09

**KEMRON**  
ENVIRONMENTAL SERVICES

SAMPLE CLASSIFICATION	
Liquid Limit:	
Plastic Limit:	
Plasticity Index:	NA
USCS Classification	
Classification	SM
AASHTO Classification	
Classification	A-2-4
Group Index	
DESCRIPTION:	
Silty Sand with Gravel	

## PARTICLE SIZE DISTRIBUTION TEST REPORT



% GRAVEL	% SAND	% SILT	% CLAY
50.0	30.4	13.5	6.1

SAMPLE INFORMATION	
Project Name:	Norwich MGP Site
Project Number:	SE-0301
Sample ID:	ISS2 Gravel Bottom (8-10)
Sample Description:	Light Brown Silty Gravel with Sand
Testing Date:	04/10/09

**KEMRON**  
ENVIRONMENTAL SERVICES

SAMPLE CLASSIFICATION	
Liquid Limit:	
Plastic Limit:	
Plasticity Index:	NA
USCS Classification	
Classification	GM
AASHTO Classification	
Classification	A-2-4
Group Index	
DESCRIPTION:	
Silty Gravel with Sand	

# PARTICLE SIZE DISTRIBUTION DATA REPORT

REPORT FORM  
ASTM D422

PROJECT: Norwich MGP Site  
PROJECT No.: SE-0301  
SAMPLE No.: ISS2 Gravel Bottom (8-10)  
SAMPLE DESCRIPT: Light Brown Silty Gravel with Sand  
TESTING DATE: 04/10/09  
TESTED BY: KG  
TRACKING CODE: 5718-GR

MOISTURE CONTENT (DRY AND WET BASIS)	
TARE WEIGHT	180.21 g
WT WET SOIL + TARE	261.16 g
WT DRY SOIL + TARE	252.64 g
WT WATER, Ww	8.52 g
WT DRY SOIL, Ws	72.43 g
ASTM MOISTURE	11.76 %
EPA MOISTURE	10.53 %

SIEVE NUMBER	PERCENT PASSING
1.5	100.0 %
1.0	100.0 %
0.75	100.0 %
0.5	88.7 %
0.375	65.8 %
#4	50.0 %
#10	40.3 %
#20	34.8 %
#40	30.2 %
#60	26.9 %
#140	21.4 %
#200	19.7 %

HYDROMETER ANALYSIS	
HYDROMETER No.	2
Wt OF DRY SOIL, Ws	14.25
DATE TESTING INITIATED	04/13/09
TIME TESTING INITIATED	10:31:00 AM

ELAPSED TIME (minutes)	ACTUAL READING	CORRECTED READING	DIAMETER (mm)	PERCENT FINER (%)
2	15.5	10.0	0.0353	13.6
5	14.0	8.7	0.0222	11.9
15	12.0	6.7	0.0130	9.1
30	11.0	5.7	0.0092	7.8
60	10.0	4.7	0.0066	6.4
260	9.5	4.2	0.0032	5.7
1489	9.0	3.7	0.0013	5.0

**Kemron**  
ENVIRONMENTAL SERVICES

# PARTICLE SIZE DISTRIBUTION DATA REPORT

REPORT FORM  
ASTM D422

PROJECT: Norwich MGP Site  
PROJECT No.: SE0301  
SAMPLE No.: ISS2 Gravel Top (5-6)  
SAMPLE DESCRIPT: Dark Brown Silty Sand with Gravel  
TESTING DATE: 04/10/09  
TESTED BY: KG  
TRACKING CODE: 5726-GR

MOISTURE CONTENT (DRY AND WET BASIS)	
TARE WEIGHT	232.16 g
WT WET SOIL + TARE	317.42 g
WT DRY SOIL + TARE	302.57 g
WT WATER, Ww	14.85 g
WT DRY SOIL, Ws	70.41 g
ASTM MOISTURE	21.09 %
EPA MOISTURE	17.42 %

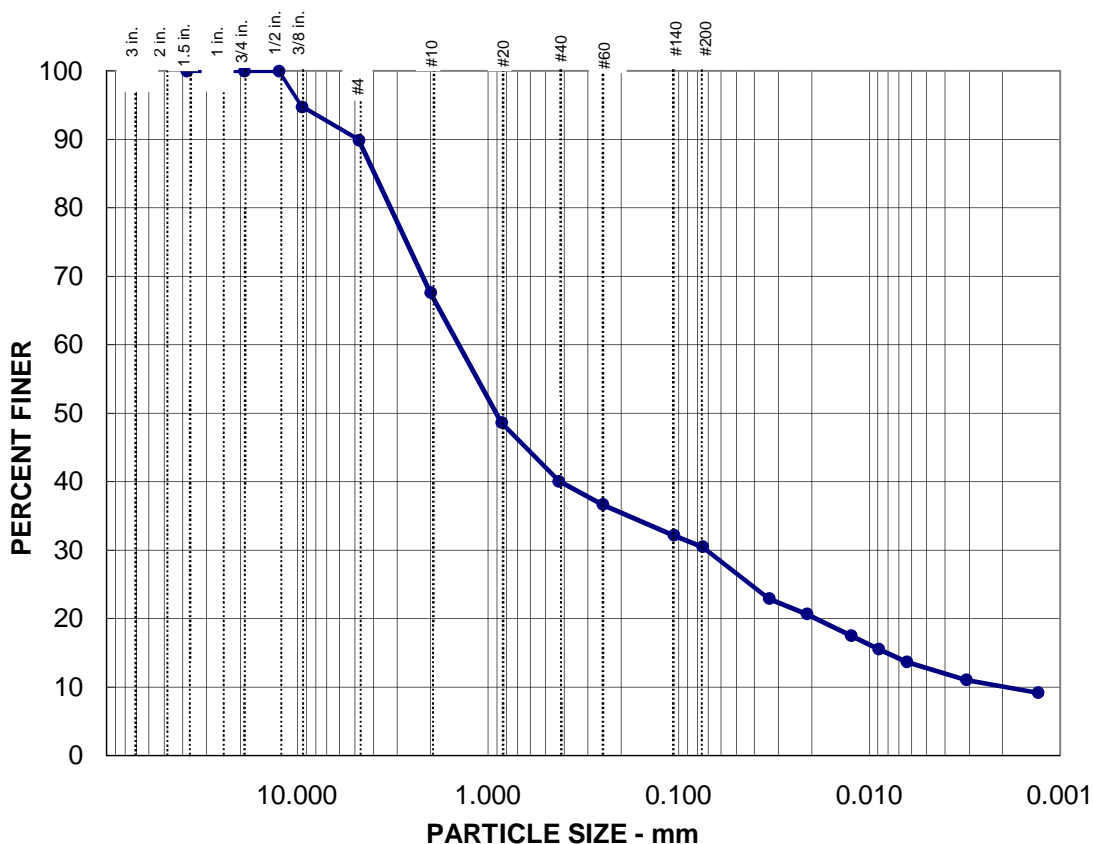
SIEVE NUMBER	PERCENT PASSING
1.5	100.0 %
1.0	100.0 %
0.75	100.0 %
0.5	95.4 %
0.375	82.4 %
#4	57.7 %
#10	42.4 %
#20	35.2 %
#40	23.2 %
#60	17.2 %
#140	13.9 %
#200	12.8 %

HYDROMETER ANALYSIS	
HYDROMETER No.	9
Wt OF DRY SOIL, Ws	9.04
DATE TESTING INITIATED	04/15/09
TIME TESTING INITIATED	10:34:00 AM

ELAPSED TIME (minutes)	ACTUAL READING	CORRECTED READING	DIAMETER (mm)	PERCENT FINER (%)
2	14.5	9.0	0.0355	12.6
5	14.0	8.5	0.0225	11.9
15	14.0	8.5	0.0130	11.9
30	13.0	7.5	0.0092	10.5
60	12.5	7.0	0.0066	9.8
244	11.5	6.0	0.0033	8.4
1440	11.0	5.5	0.0013	7.7

**Kemron**  
ENVIRONMENTAL SERVICES

## PARTICLE SIZE DISTRIBUTION TEST REPORT



% GRAVEL	% SAND	% SILT	% CLAY
10.1	59.4	17.7	12.8

SAMPLE INFORMATION	
Project Name:	Norwich MGP Site
Project Number:	SE-0301
Sample ID:	ISS1 Sand (6-7)
Sample Description:	Brown Silty Sand
Testing Date:	04/10/09

**KEMRON**  
ENVIRONMENTAL SERVICES

SAMPLE CLASSIFICATION	
Liquid Limit:	
Plastic Limit:	
Plasticity Index:	NA
USCS Classification	
Classification	SM
AASHTO Classification	
Classification	A-2-4
Group Index	
DESCRIPTION:	
Silty Sand	



# PARTICLE SIZE DISTRIBUTION DATA REPORT

REPORT FORM  
ASTM D422

PROJECT: Norwich MGP Site  
PROJECT No.: SE-0301  
SAMPLE No.: ISS1 Sand (6-7)  
SAMPLE DESCRIPT: Brown Silty Sand  
TESTING DATE: 04/10/09  
TESTED BY: KG  
TRACKING CODE: 5721-GR

MOISTURE CONTENT (DRY AND WET BASIS)	
TARE WEIGHT	226.22 g
WT WET SOIL + TARE	308.95 g
WT DRY SOIL + TARE	303.75 g
WT WATER, Ww	5.20 g
WT DRY SOIL, Ws	77.53 g
ASTM MOISTURE	6.71 %
EPA MOISTURE	6.29 %

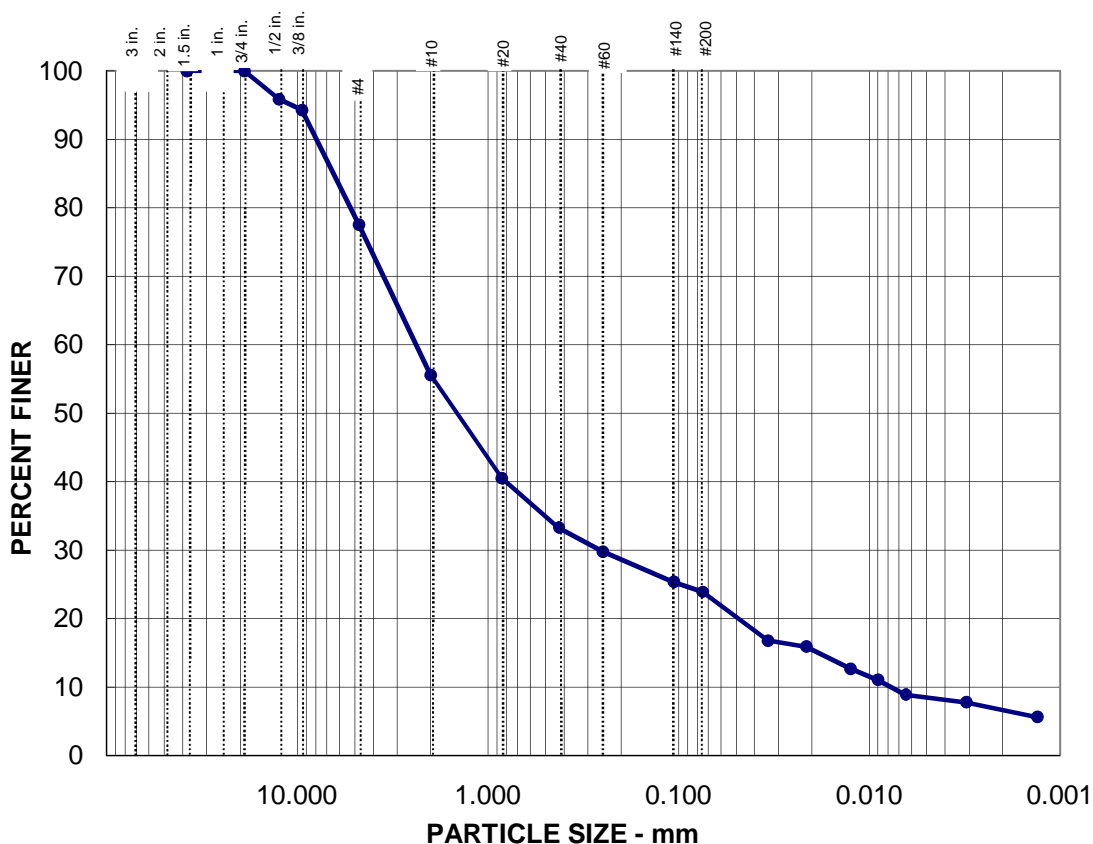
SIEVE NUMBER	PERCENT PASSING
1.5	100.0 %
1.0	100.0 %
0.75	100.0 %
0.5	100.0 %
0.375	94.7 %
#4	89.9 %
#10	67.6 %
#20	48.6 %
#40	40.1 %
#60	36.7 %
#140	32.2 %
#200	30.5 %

HYDROMETER ANALYSIS	
HYDROMETER No.	3
Wt OF DRY SOIL, Ws	23.61
DATE TESTING INITIATED	04/13/09
TIME TESTING INITIATED	10:32:00 AM

ELAPSED TIME (minutes)	ACTUAL READING	CORRECTED READING	DIAMETER (mm)	PERCENT FINER (%)
2	23.5	18.0	0.0335	22.9
5	21.5	16.2	0.0212	20.7
15	19.0	13.7	0.0125	17.5
30	17.5	12.2	0.0089	15.5
60	16.0	10.7	0.0063	13.6
260	14.0	8.7	0.0031	11.1
1490	12.5	7.2	0.0013	9.2

**Kemron**  
ENVIRONMENTAL SERVICES

## PARTICLE SIZE DISTRIBUTION TEST REPORT



% GRAVEL	% SAND	% SILT	% CLAY
22.4	53.7	15.4	8.5

SAMPLE INFORMATION	
Project Name:	Norwich MGP Site
Project Number:	SE-0301
Sample ID:	ISS1 Gravel Top (7-8)
Sample Description:	Dark Brown Silty Sand with Gravel
Testing Date:	04/10/09

**KEMRON**  
ENVIRONMENTAL SERVICES

SAMPLE CLASSIFICATION	
Liquid Limit:	
Plastic Limit:	
Plasticity Index:	NA
USCS Classification	
Classification	SM
AASHTO Classification	
Classification	A-2-4
Group Index	
DESCRIPTION:	
Silty Sand with Gravel	

# PARTICLE SIZE DISTRIBUTION DATA REPORT

REPORT FORM  
ASTM D422

PROJECT: Norwich MGP Site  
PROJECT No.: SE-0301  
SAMPLE No.: ISS1 Gravel Top (7-8)  
SAMPLE DESCRIPT: Dark Brown Silty Sand with Gravel  
TESTING DATE: 04/10/09  
TESTED BY: KG  
TRACKING CODE: 5722-GR

MOISTURE CONTENT (DRY AND WET BASIS)	
TARE WEIGHT	201.19 g
WT WET SOIL + TARE	299.06 g
WT DRY SOIL + TARE	292.35 g
WT WATER, Ww	6.71 g
WT DRY SOIL, Ws	91.16 g
ASTM MOISTURE	7.36 %
EPA MOISTURE	6.86 %

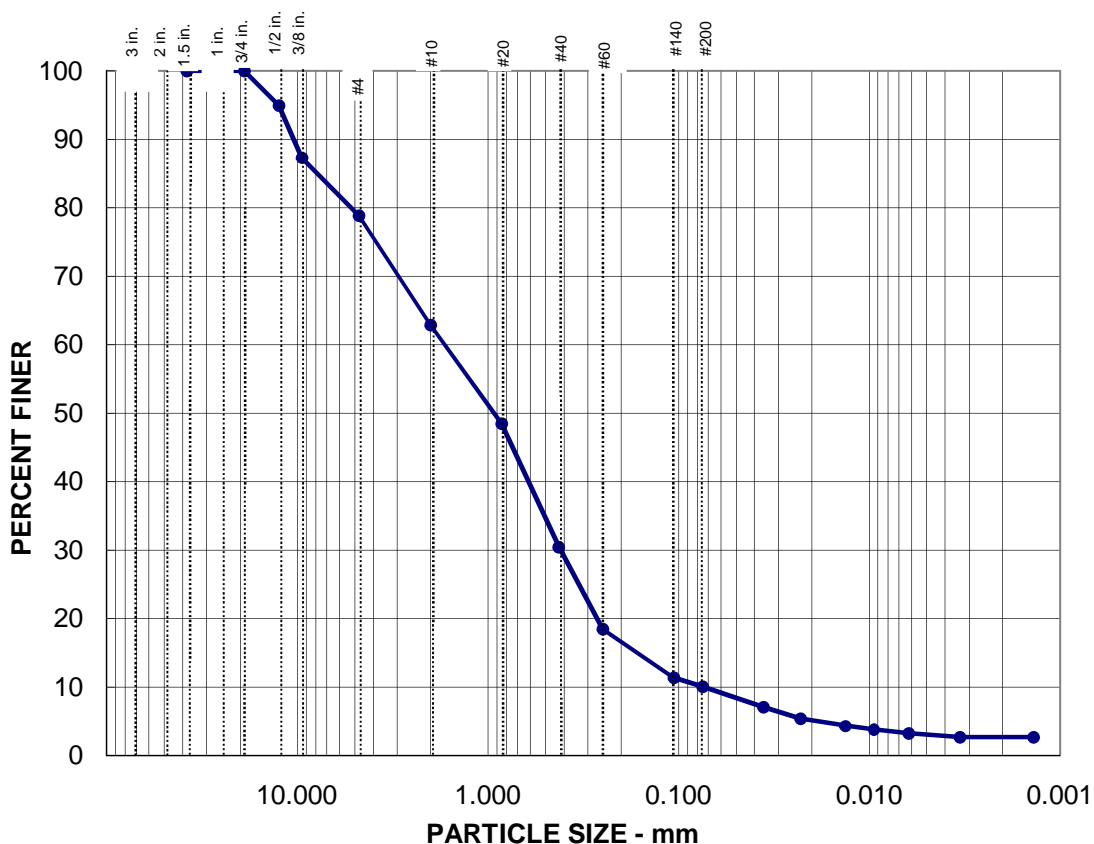
SIEVE NUMBER	PERCENT PASSING
1.5	100.0 %
1.0	100.0 %
0.75	100.0 %
0.5	95.9 %
0.375	94.3 %
#4	77.6 %
#10	55.6 %
#20	40.5 %
#40	33.3 %
#60	29.8 %
#140	25.4 %
#200	23.9 %

HYDROMETER ANALYSIS	
HYDROMETER No.	4
Wt OF DRY SOIL, Ws	21.80
DATE TESTING INITIATED	04/13/09
TIME TESTING INITIATED	10:33:00 AM

ELAPSED TIME (minutes)	ACTUAL READING	CORRECTED READING	DIAMETER (mm)	PERCENT FINER (%)
2	21.0	15.5	0.0341	16.8
5	20.0	14.7	0.0214	15.9
15	17.0	11.7	0.0126	12.7
30	15.5	10.2	0.0090	11.1
60	13.5	8.2	0.0064	8.9
260	12.5	7.2	0.0031	7.8
1490	10.5	5.2	0.0013	5.6

**Kemron**  
ENVIRONMENTAL SERVICES

## PARTICLE SIZE DISTRIBUTION TEST REPORT



% GRAVEL	% SAND	% SILT	% CLAY
21.2	68.8	7.0	3.0

SAMPLE INFORMATION	
Project Name:	Norwich MGP Site
Project Number:	SE0301
Sample ID:	ISS1 Gravel Bottom (19-20)
Sample Description:	Well-graded Sand with Silt and Gravel
Testing Date:	04/10/09

**KEMRON**  
ENVIRONMENTAL SERVICES

SAMPLE CLASSIFICATION	
Liquid Limit:	
Plastic Limit:	
Plasticity Index:	NA
USCS Classification	
Classification	SW-SM
AASHTO Classification	
Classification	A-2-4
Group Index	
DESCRIPTION:	
Well-Graded Sand with Silt and Gravel	

# PARTICLE SIZE DISTRIBUTION DATA REPORT

REPORT FORM  
ASTM D422

PROJECT: Norwich MGP Site  
PROJECT No.: SE0301  
SAMPLE No.: ISS1 Gravel Bottom (19-20)  
SAMPLE DESCRIPT: Well-graded Sand with Silt and Grav  
TESTING DATE: 04/10/09  
TESTED BY: KG  
TRACKING CODE: 5724-GR

MOISTURE CONTENT (DRY AND WET BASIS)	
TARE WEIGHT	233.45 g
WT WET SOIL + TARE	339.95 g
WT DRY SOIL + TARE	324.15 g
WT WATER, Ww	15.80 g
WT DRY SOIL, Ws	90.70 g
ASTM MOISTURE	17.42 %
EPA MOISTURE	14.84 %

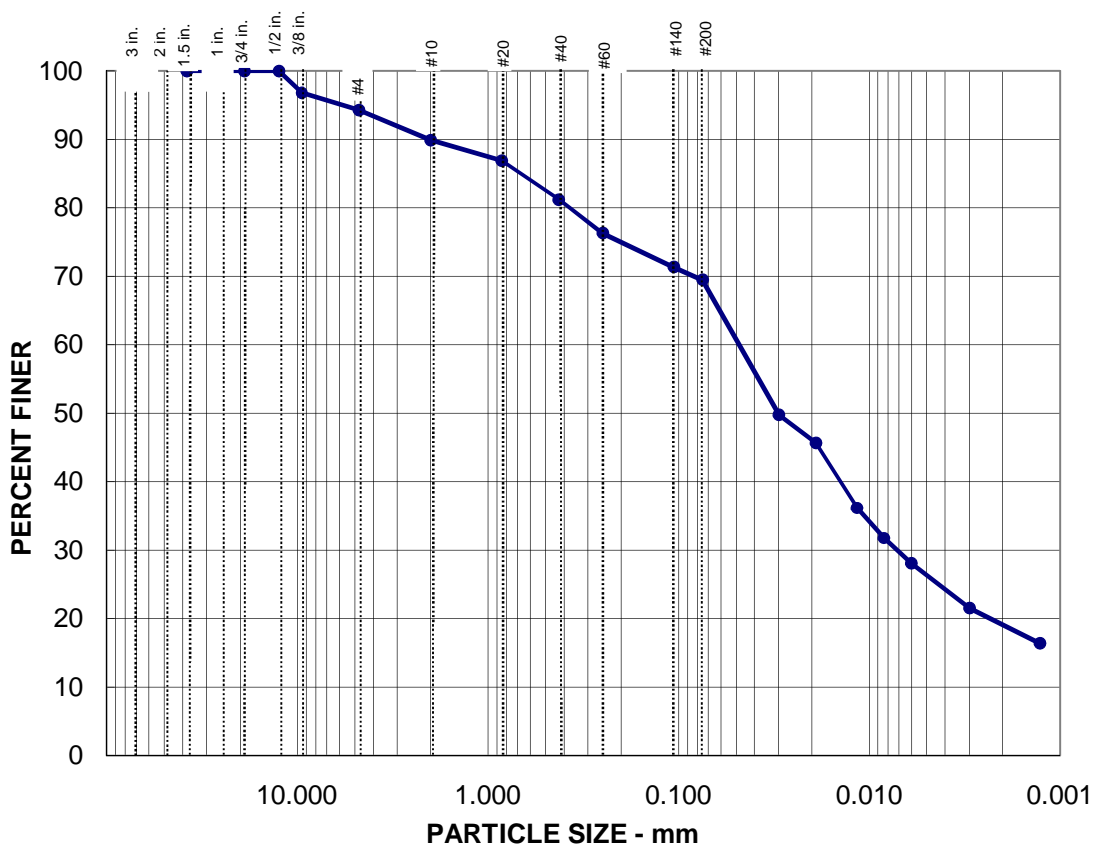
SIEVE NUMBER	PERCENT PASSING
1.5	100.0 %
1.0	100.0 %
0.75	100.0 %
0.5	95.0 %
0.375	87.3 %
#4	78.8 %
#10	62.9 %
#20	48.5 %
#40	30.5 %
#60	18.4 %
#140	11.4 %
#200	10.1 %

HYDROMETER ANALYSIS	
HYDROMETER No.	8
Wt OF DRY SOIL, Ws	9.12
DATE TESTING INITIATED	04/15/09
TIME TESTING INITIATED	10:35:00 AM

ELAPSED TIME (minutes)	ACTUAL READING	CORRECTED READING	DIAMETER (mm)	PERCENT FINER (%)
2	12.0	6.5	0.0360	7.1
5	10.5	5.0	0.0230	5.4
15	9.5	4.0	0.0133	4.3
30	9.0	3.5	0.0094	3.8
70	8.5	3.0	0.0062	3.2
244	8.0	2.5	0.0033	2.7
1440	8.0	2.5	0.0014	2.7

**Kemron**  
ENVIRONMENTAL SERVICES

## PARTICLE SIZE DISTRIBUTION TEST REPORT



% GRAVEL	% SAND	% SILT	% CLAY
5.7	24.8	43.1	26.4

SAMPLE INFORMATION	
Project Name:	Norwich MGP Site
Project Number:	SE-0301
Sample ID:	ISS4 Sand (3-5)
Sample Description:	Dark Brown Sandy Silt
Testing Date:	04/10/09

**KEMRON**  
ENVIRONMENTAL SERVICES

SAMPLE CLASSIFICATION	
Liquid Limit:	
Plastic Limit:	
Plasticity Index:	NA
USCS Classification	
Classification	ML
AASHTO Classification	
Classification	A-4
Group Index	
DESCRIPTION:	
Sandy Silt	

# PARTICLE SIZE DISTRIBUTION DATA REPORT

REPORT FORM  
ASTM D422

PROJECT: \_\_\_\_\_ Norwich MGP Site  
PROJECT No.: \_\_\_\_\_ SE-0301  
SAMPLE No.: \_\_\_\_\_ ISS4 Sand (3-5)  
SAMPLE DESCRIPT: \_\_\_\_\_ Dark Brown Sandy Silt  
TESTING DATE: \_\_\_\_\_ 04/10/09  
TESTED BY: \_\_\_\_\_ KG  
TRACKING CODE: \_\_\_\_\_ 5715-GR

MOISTURE CONTENT (DRY AND WET BASIS)	
TARE WEIGHT	231.12 g
WT WET SOIL + TARE	312.84 g
WT DRY SOIL + TARE	298.68 g
WT WATER, Ww	14.16 g
WT DRY SOIL, Ws	67.56 g
ASTM MOISTURE	20.96 %
EPA MOISTURE	17.33 %

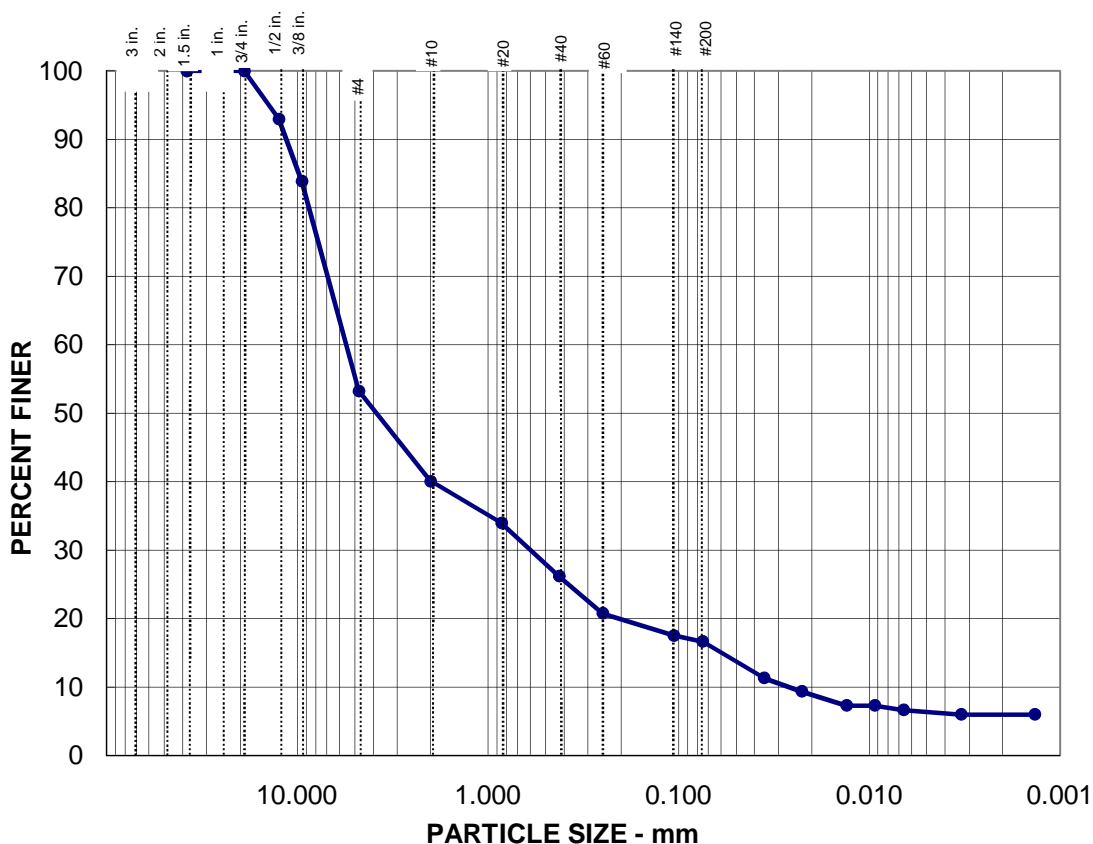
SIEVE NUMBER	PERCENT PASSING
1.5	100.0 %
1.0	100.0 %
0.75	100.0 %
0.5	100.0 %
0.375	96.8 %
#4	94.3 %
#10	89.9 %
#20	86.9 %
#40	81.2 %
#60	76.3 %
#140	71.3 %
#200	69.5 %

HYDROMETER ANALYSIS	
HYDROMETER No.	1
Wt OF DRY SOIL, Ws	46.94
DATE TESTING INITIATED	04/13/09
TIME TESTING INITIATED	10:30:00 AM

ELAPSED TIME (minutes)	ACTUAL READING	CORRECTED READING	DIAMETER (mm)	PERCENT FINER (%)
2	39.5	34.0	0.0298	49.8
5	36.5	31.2	0.0191	45.7
15	30.0	24.7	0.0116	36.2
30	27.0	21.7	0.0084	31.8
60	24.5	19.2	0.0060	28.1
260	20.0	14.7	0.0030	21.5
1489	16.5	11.2	0.0013	16.4

**Kemron**  
ENVIRONMENTAL SERVICES

## PARTICLE SIZE DISTRIBUTION TEST REPORT



% GRAVEL	% SAND	% SILT	% CLAY
46.7	36.6	10.3	6.4

SAMPLE INFORMATION	
Project Name:	Norwich MGP Site
Project Number:	SE0301
Sample ID:	ISS4 Gravel Top (5-7)
Sample Description:	Light Brown Silty Gravel with Sand
Testing Date:	04/10/09

**KEMRON**  
ENVIRONMENTAL SERVICES

SAMPLE CLASSIFICATION	
Liquid Limit:	
Plastic Limit:	
Plasticity Index:	NA
USCS Classification	
Classification	GM
AASHTO Classification	
Classification	A-2-4
Group Index	
DESCRIPTION:	
Silty Gravel with Sand	



# PARTICLE SIZE DISTRIBUTION DATA REPORT

REPORT FORM  
ASTM D422

PROJECT: Norwich MGP Site  
PROJECT No.: SE0301  
SAMPLE No.: ISS4 Gravel Top (5-7)  
SAMPLE DESCRIPT: Light Brown Silty Gravel with Sand  
TESTING DATE: 04/10/09  
TESTED BY: KG  
TRACKING CODE: 5717-GR

MOISTURE CONTENT (DRY AND WET BASIS)	
TARE WEIGHT	231.81 g
WT WET SOIL + TARE	312.06 g
WT DRY SOIL + TARE	305.65 g
WT WATER, Ww	6.41 g
WT DRY SOIL, Ws	73.84 g
ASTM MOISTURE	8.68 %
EPA MOISTURE	7.99 %

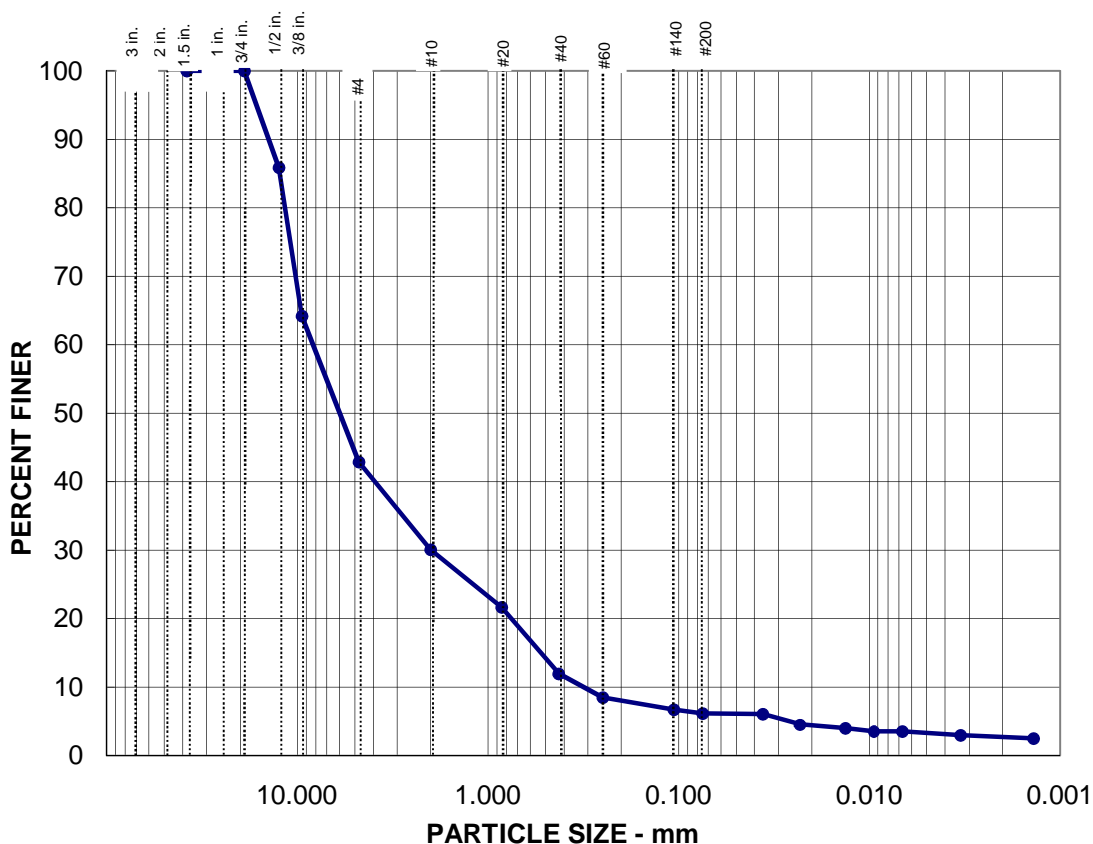
SIEVE NUMBER	PERCENT PASSING
1.5	100.0 %
1.0	100.0 %
0.75	100.0 %
0.5	93.0 %
0.375	83.9 %
#4	53.3 %
#10	40.0 %
#20	34.0 %
#40	26.2 %
#60	20.7 %
#140	17.5 %
#200	16.6 %

HYDROMETER ANALYSIS	
HYDROMETER No.	3
Wt OF DRY SOIL, Ws	12.27
DATE TESTING INITIATED	04/15/07
TIME TESTING INITIATED	10:31:00 AM

ELAPSED TIME (minutes)	ACTUAL READING	CORRECTED READING	DIAMETER (mm)	PERCENT FINER (%)
2	14.0	8.5	0.0356	11.3
5	12.5	7.0	0.0227	9.3
15	11.0	5.5	0.0132	7.3
30	11.0	5.5	0.0093	7.3
60	10.5	5.0	0.0066	6.6
244	10.0	4.5	0.0033	6.0
1440	10.0	4.5	0.0014	6.0

**Kemron**  
ENVIRONMENTAL SERVICES

## PARTICLE SIZE DISTRIBUTION TEST REPORT



% GRAVEL	% SAND	% SILT	% CLAY
57.1	36.7	2.9	3.3

SAMPLE INFORMATION	
Project Name:	Norwich MGP Site
Project Number:	SE-0301
Sample ID:	ISS4 Gravel Bottom (16-18)
Sample Description:	Well-Graded Gravel with Silt and Sand
Testing Date:	04/10/09

**KEMRON**  
ENVIRONMENTAL SERVICES

SAMPLE CLASSIFICATION	
Liquid Limit:	
Plastic Limit:	
Plasticity Index:	NA
USCS Classification	
Classification	GW-GM
AASHTO Classification	
Classification	A-2-4
Group Index	
DESCRIPTION:	
Well-Graded Gravel with Silt and Sand	

# PARTICLE SIZE DISTRIBUTION DATA REPORT

REPORT FORM  
ASTM D422

PROJECT: Norwich MGP Site  
PROJECT No.: SE-0301  
SAMPLE No.: ISS4 Gravel Bottom (16-18)  
SAMPLE DESCRIPT: Well-Graded Gravel with Silt and Sand  
TESTING DATE: 04/10/09  
TESTED BY: KG  
TRACKING CODE: 5723-GR

MOISTURE CONTENT (DRY AND WET BASIS)	
TARE WEIGHT	233.08 g
WT WET SOIL + TARE	340.90 g
WT DRY SOIL + TARE	331.48 g
WT WATER, Ww	9.42 g
WT DRY SOIL, Ws	98.40 g
ASTM MOISTURE	9.57 %
EPA MOISTURE	8.74 %

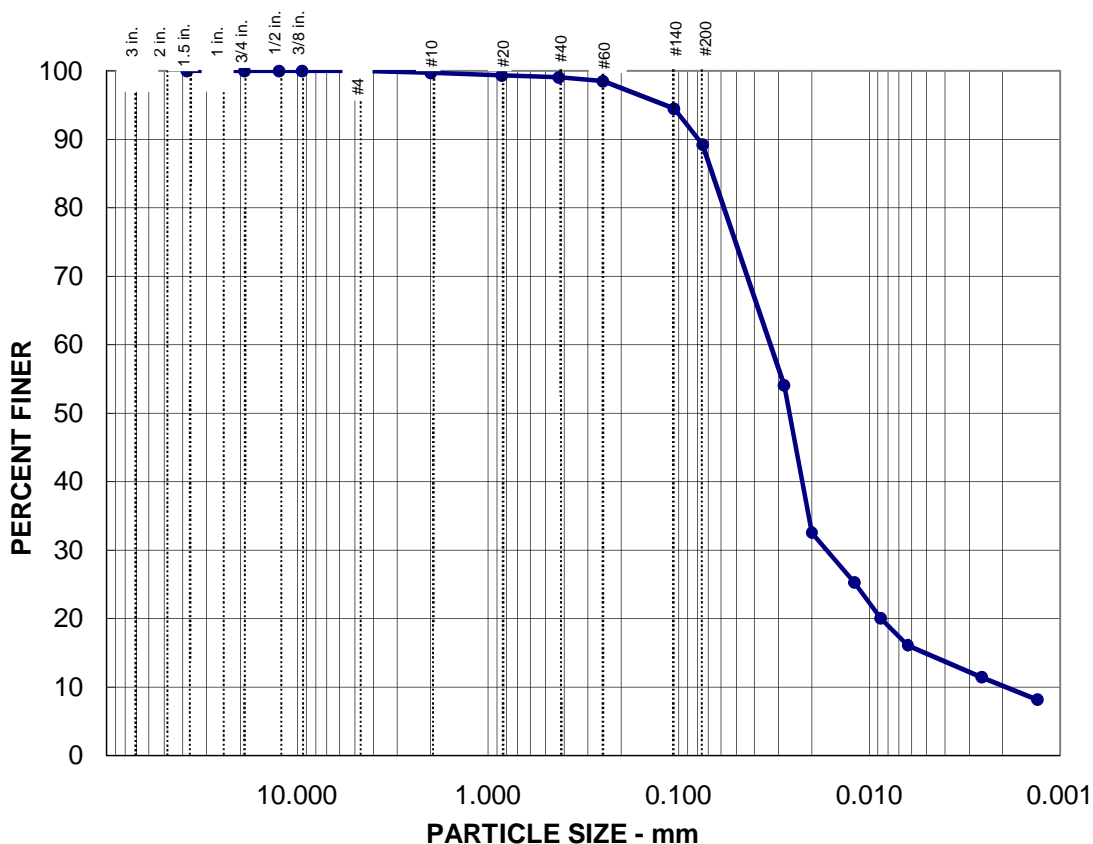
SIEVE NUMBER	PERCENT PASSING
1.5	100.0 %
1.0	100.0 %
0.75	100.0 %
0.5	85.9 %
0.375	64.2 %
#4	42.9 %
#10	30.1 %
#20	21.6 %
#40	11.9 %
#60	8.4 %
#140	6.7 %
#200	6.2 %

HYDROMETER ANALYSIS	
HYDROMETER No.	7
Wt OF DRY SOIL, Ws	6.06
DATE TESTING INITIATED	04/15/09
TIME TESTING INITIATED	10:33:00 AM

ELAPSED TIME (minutes)	ACTUAL READING	CORRECTED READING	DIAMETER (mm)	PERCENT FINER (%)
2	11.5	6.0	0.0361	6.0
5	10.0	4.5	0.0230	4.5
15	9.5	4.0	0.0133	4.0
30	9.0	3.5	0.0094	3.5
60	9.0	3.5	0.0067	3.5
244	8.5	3.0	0.0033	3.0
1440	8.0	2.5	0.0014	2.5

**Kemron**  
ENVIRONMENTAL SERVICES

## PARTICLE SIZE DISTRIBUTION TEST REPORT



% GRAVEL	% SAND	% SILT	% CLAY
0.0	10.7	74.4	14.9

SAMPLE INFORMATION	
Project Name:	Norwich MGP Site
Project Number:	SE-0301
Sample ID:	ISS3 Sand (2-4)
Sample Description:	Dark Brown Silt
Testing Date:	04/10/09

**KEMRON**  
ENVIRONMENTAL SERVICES

SAMPLE CLASSIFICATION	
Liquid Limit:	
Plastic Limit:	
Plasticity Index:	NA
USCS Classification	
Classification	ML
AASHTO Classification	
Classification	A-4
Group Index	
DESCRIPTION:	
Silt	

# PARTICLE SIZE DISTRIBUTION DATA REPORT

REPORT FORM  
ASTM D422

PROJECT: \_\_\_\_\_ Norwich MGP Site  
PROJECT No.: \_\_\_\_\_ SE-0301  
SAMPLE No.: \_\_\_\_\_ ISS3 Sand (2-4)  
SAMPLE DESCRIPT: \_\_\_\_\_ Dark Brown Silt  
TESTING DATE: \_\_\_\_\_ 04/10/09  
TESTED BY: \_\_\_\_\_ KG  
TRACKING CODE: \_\_\_\_\_ 5720-GR

MOISTURE CONTENT (DRY AND WET BASIS)	
TARE WEIGHT	196.04 g
WT WET SOIL + TARE	283.90 g
WT DRY SOIL + TARE	271.04 g
WT WATER, Ww	12.86 g
WT DRY SOIL, Ws	75.00 g
ASTM MOISTURE	17.15 %
EPA MOISTURE	14.64 %

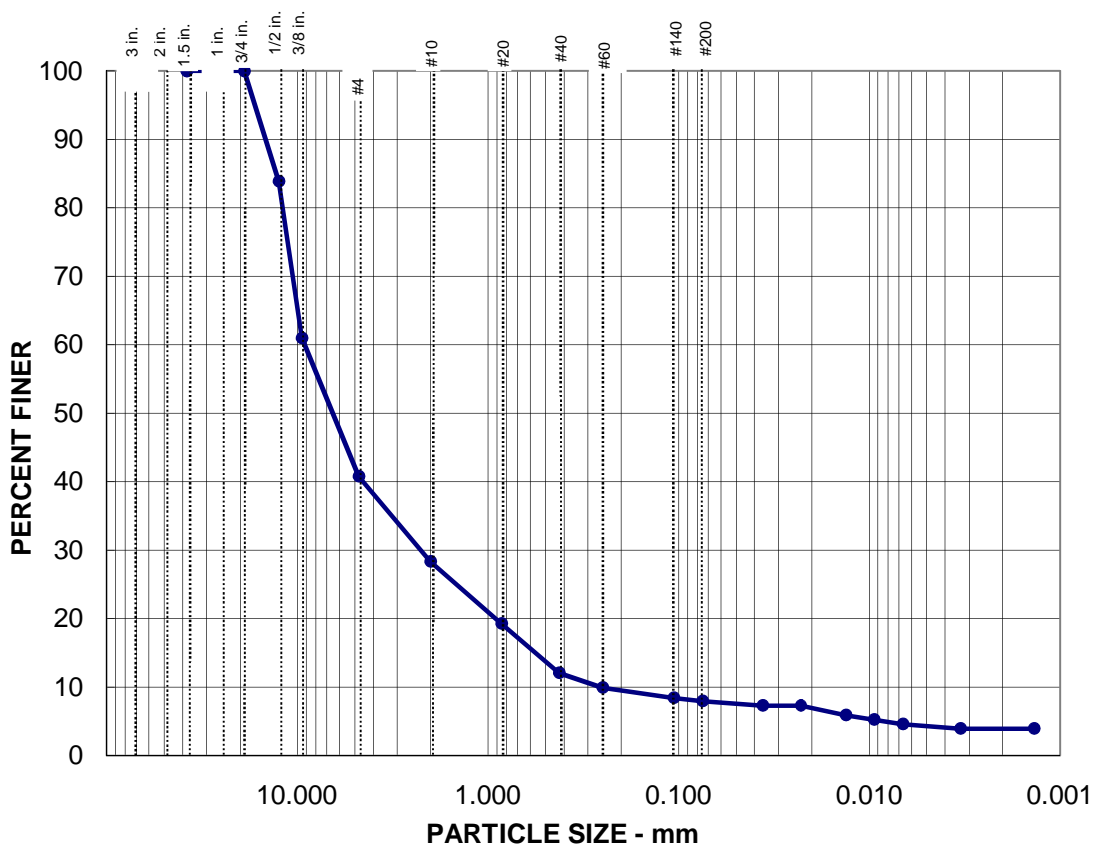
SIEVE NUMBER	PERCENT PASSING
1.5	100.0 %
1.0	100.0 %
0.75	100.0 %
0.5	100.0 %
0.375	100.0 %
#4	100.0 %
#10	99.7 %
#20	99.4 %
#40	99.0 %
#60	98.5 %
#140	94.5 %
#200	89.3 %

HYDROMETER ANALYSIS	
HYDROMETER No.	5
Wt OF DRY SOIL, Ws	66.95
DATE TESTING INITIATED	04/14/09
TIME TESTING INITIATED	5:00:00 AM

ELAPSED TIME (minutes)	ACTUAL READING	CORRECTED READING	DIAMETER (mm)	PERCENT FINER (%)
2	46.5	41.0	0.0280	54.1
5	30.0	24.7	0.0200	32.6
15	24.5	19.2	0.0120	25.3
30	20.5	15.2	0.0087	20.0
60	17.5	12.2	0.0063	16.1
371	14.0	8.7	0.0026	11.5
1476	11.5	6.2	0.0013	8.2

**Kemron**  
ENVIRONMENTAL SERVICES

## PARTICLE SIZE DISTRIBUTION TEST REPORT



% GRAVEL	% SAND	% SILT	% CLAY
59.2	32.8	3.6	4.4

SAMPLE INFORMATION	
Project Name:	Norwich MGP Site
Project Number:	SE-0301
Sample ID:	ISS3 Gravel Top (4-6)
Sample Description:	Well-graded gravel with silt and sand
Testing Date:	04/10/09

**KEMRON**  
ENVIRONMENTAL SERVICES

SAMPLE CLASSIFICATION	
Liquid Limit:	
Plastic Limit:	
Plasticity Index:	NA
USCS Classification	
Classification	GW-GM
AASHTO Classification	
Classification	A-2-4
Group Index	
DESCRIPTION:	
Well-Graded Gravel with Silt and Sand	

# PARTICLE SIZE DISTRIBUTION DATA REPORT

REPORT FORM  
ASTM D422

PROJECT: Norwich MGP Site  
PROJECT No.: SE-0301  
SAMPLE No.: ISS3 Gravel Top (4-6)  
SAMPLE DESCRIPT: Well-graded gravel with silt and sand  
TESTING DATE: 04/10/09  
TESTED BY: KG  
TRACKING CODE: 5716-GR

MOISTURE CONTENT (DRY AND WET BASIS)	
TARE WEIGHT	230.91 g
WT WET SOIL + TARE	311.34 g
WT DRY SOIL + TARE	304.90 g
WT WATER, Ww	6.44 g
WT DRY SOIL, Ws	73.99 g
ASTM MOISTURE	8.70 %
EPA MOISTURE	8.01 %

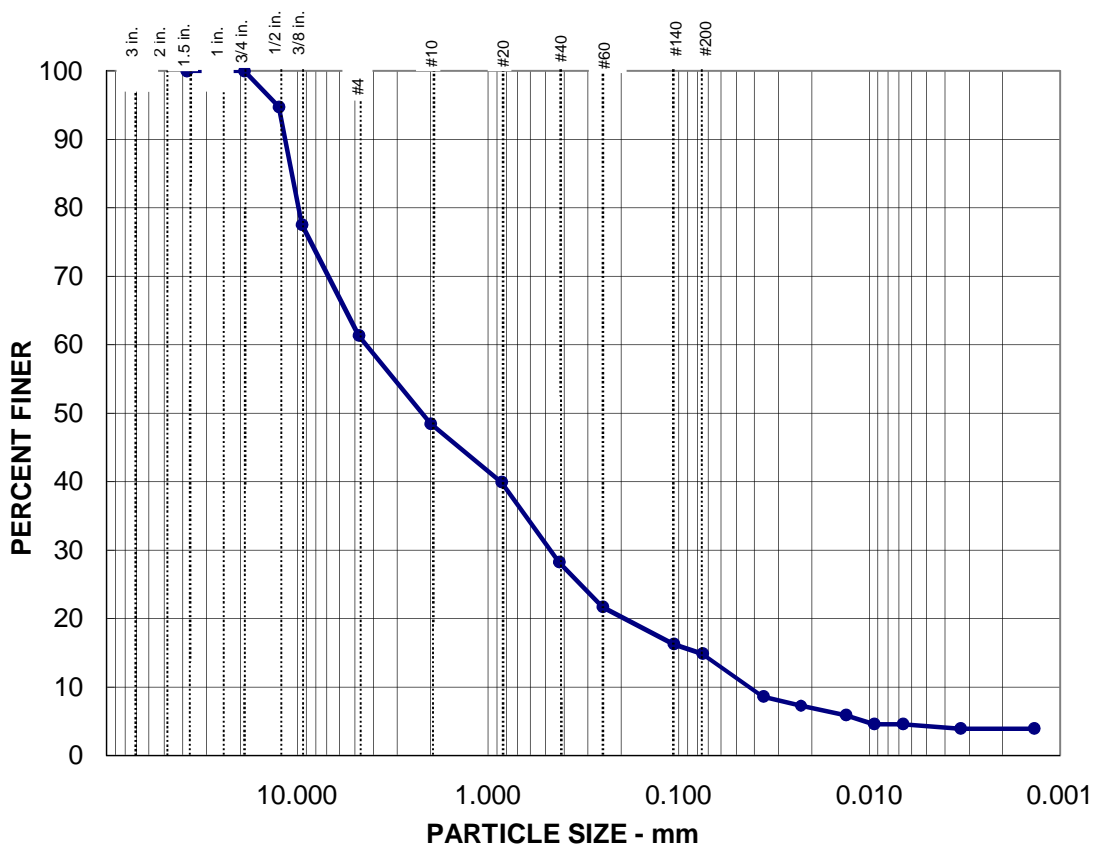
SIEVE NUMBER	PERCENT PASSING
1.5	100.0 %
1.0	100.0 %
0.75	100.0 %
0.5	83.9 %
0.375	61.0 %
#4	40.8 %
#10	28.4 %
#20	19.3 %
#40	12.1 %
#60	9.9 %
#140	8.4 %
#200	7.9 %

HYDROMETER ANALYSIS	
HYDROMETER No.	2
Wt OF DRY SOIL, Ws	5.88
DATE TESTING INITIATED	04/15/09
TIME TESTING INITIATED	10:30:00 AM

ELAPSED TIME (minutes)	ACTUAL READING	CORRECTED READING	DIAMETER (mm)	PERCENT FINER (%)
2	11.0	5.5	0.0362	7.3
5	11.0	5.5	0.0229	7.3
15	10.0	4.5	0.0133	6.0
30	9.5	4.0	0.0094	5.3
60	9.0	3.5	0.0067	4.6
244	8.5	3.0	0.0033	4.0
1440	8.5	3.0	0.0014	4.0

**Kemron**  
ENVIRONMENTAL SERVICES

## PARTICLE SIZE DISTRIBUTION TEST REPORT



% GRAVEL	% SAND	% SILT	% CLAY
38.6	46.5	10.6	4.3

SAMPLE INFORMATION	
Project Name:	Norwich MGP Site
Project Number:	SE0301
Sample ID:	ISS3 Gravel Bottom (10-12)
Sample Description:	Light Brown Silty Sand with Gravel
Testing Date:	04/10/09

**KEMRON**  
ENVIRONMENTAL SERVICES

SAMPLE CLASSIFICATION	
Liquid Limit:	
Plastic Limit:	
Plasticity Index:	NA
USCS Classification	
Classification	SM
AASHTO Classification	
Classification	A-2-4
Group Index	
DESCRIPTION:	
Silty Sand with Gravel	



# PARTICLE SIZE DISTRIBUTION DATA REPORT

REPORT FORM  
ASTM D422

PROJECT: Norwich MGP Site  
PROJECT No.: SE0301  
SAMPLE No.: ISS3 Gravel Bottom (10-12)  
SAMPLE DESCRIPT: Light Brown Silty Sand with Gravel  
TESTING DATE: 04/10/09  
TESTED BY: KG  
TRACKING CODE: 5719-GR

MOISTURE CONTENT (DRY AND WET BASIS)	
TARE WEIGHT	231.19 g
WT WET SOIL + TARE	314.79 g
WT DRY SOIL + TARE	305.64 g
WT WATER, Ww	9.15 g
WT DRY SOIL, Ws	74.45 g
ASTM MOISTURE	12.29 %
EPA MOISTURE	10.94 %

SIEVE NUMBER	PERCENT PASSING
1.5	100.0 %
1.0	100.0 %
0.75	100.0 %
0.5	94.8 %
0.375	77.6 %
#4	61.4 %
#10	48.5 %
#20	39.9 %
#40	28.2 %
#60	21.7 %
#140	16.3 %
#200	14.8 %

HYDROMETER ANALYSIS	
HYDROMETER No.	4
Wt OF DRY SOIL, Ws	11.05
DATE TESTING INITIATED	04/15/09
TIME TESTING INITIATED	10:32:00 AM

ELAPSED TIME (minutes)	ACTUAL READING	CORRECTED READING	DIAMETER (mm)	PERCENT FINER (%)
2	12.0	6.5	0.0360	8.6
5	11.0	5.5	0.0229	7.3
15	10.0	4.5	0.0133	5.9
30	9.0	3.5	0.0094	4.6
60	9.0	3.5	0.0067	4.6
244	8.5	3.0	0.0033	3.9
1440	8.5	3.0	0.0014	3.9

**Kemron**  
ENVIRONMENTAL SERVICES

# **APPENDIX B**

## **MIXTURE DEVELOPMENT**

# MIX DEVELOPMENT DATA SHEET

PROJECT: Norwich MGP Site MIX No. 0301-001  
 PROJECT No.: SE-0301  
 MIXING DATE: 1-May-09 MIXED BY: SEM / RLS

UNTREATED MATERIAL TYPE	Sand / Silt	
WEIGHT OF UNTREATED MATERIAL	3,300 g	
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement	5.00 %	165.0 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
Water Addition	2.18 %	71.97 g

OBSERVATIONS / NOTES **Slurry**  
 Penetrometer: Days 3,5, and 7  
 UCS: Days 7,14, and 28  
 Freeze/Thaw: Day 7 or 28  
 Permeability: Day 7 or 28

MONITORING ACTIVITIES					
MONITORING ACTIVITIES	TIME PERIOD				
	Initial	Initial Mix	5 min	10 min	30 Min
MAXIMUM PID (ppm)					
MAXIMUM TEMP (øC)					
OTHER:					

PENETROMETER ANALYSES					
CURE TIME (Days)	3	5	7	7	14
PENETROMETER (tons/ftý)	>4.5	>4.5	>4.5		

VOLUMETRIC EXPANSION	
INITIAL HEIGHT (in):	FINAL HEIGHT (in):
VOLUMETRIC EXPANSION (%):	

# MIX DEVELOPMENT DATA SHEET

PROJECT: Norwich MGP Site MIX No. 0301-002  
 PROJECT No.: SE-0301  
 MIXING DATE: 1-May-09 MIXED BY: SEM/RLS

UNTREATED MATERIAL TYPE	Sand/Silt	
WEIGHT OF UNTREATED MATERIAL	3,300 g	
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement	10.00 %	330.0 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
Water Addition	4.23 %	139.61 g

OBSERVATIONS / NOTES **Slurry**  
 Penetrometer: Days 3,5, and 7  
 UCS: Days 7,14, and 28  
 Freeze/Thaw: Day 7 or 28  
 Permeability: Day 7 or 28

MONITORING ACTIVITIES					
MONITORING ACTIVITIES	TIME PERIOD				
	Initial	Initial Mix	5 min	10 min	30 Min
MAXIMUM PID (ppm)					
MAXIMUM TEMP (øC)					
OTHER:					

PENETROMETER ANALYSES					
CURE TIME (Days)	3	5	7	7	14
PENETROMETER (tons/ftý)	>4.5	>4.5	>4.5		

VOLUMETRIC EXPANSION	
INITIAL HEIGHT (in):	FINAL HEIGHT (in):
VOLUMETRIC EXPANSION (%):	

# MIX DEVELOPMENT DATA SHEET

PROJECT: Norwich MGP Site MIX No. 0301-003  
 PROJECT No.: SE-0301  
 MIXING DATE: 4-May-09 MIXED BY: SEM/RLS

UNTREATED MATERIAL TYPE	Sand/Silt	
WEIGHT OF UNTREATED MATERIAL	3,300 g	
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement	15.00 %	495.0 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
Water Addition	6.79 %	223.94 g

OBSERVATIONS / NOTES **Slurry**  
 Penetrometer: Days 3,5, and 7  
 UCS: Days 7,14, and 28  
 Freeze/Thaw: Day 7 or 28  
 Permeability: Day 7 or 28

MONITORING ACTIVITIES					
MONITORING ACTIVITIES	TIME PERIOD				
	Initial	Initial Mix	5 min	10 min	30 Min
MAXIMUM PID (ppm)					
MAXIMUM TEMP (øC)					
OTHER:					

PENETROMETER ANALYSES					
CURE TIME (Days)	3	5	7	7	14
PENETROMETER (tons/ft <sup>2</sup> )	>4.5	>4.5	>4.5		

VOLUMETRIC EXPANSION	
INITIAL HEIGHT (in):	FINAL HEIGHT (in):
VOLUMETRIC EXPANSION (%):	

# MIX DEVELOPMENT DATA SHEET

PROJECT: Norwich MGP Site MIX No. 0301-004  
 PROJECT No.: SE-0301  
 MIXING DATE: 5-May-09 MIXED BY: SEM/RLS

UNTREATED MATERIAL TYPE	Sand/Silt	
WEIGHT OF UNTREATED MATERIAL	3,300 g	
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement	10.00 %	330.0 g
Bentonite	1.00 %	33.0 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
Water Addition	6.85 %	226.0 g

OBSERVATIONS / NOTES **Slurry**  
 Penetrometer: Days 3,5, and 7  
 UCS: Days 7,14, and 28  
 Freeze/Thaw: Day 7 or 28  
 Permeability: Day 7 or 28

MONITORING ACTIVITIES					
MONITORING ACTIVITIES	TIME PERIOD				
	Initial	Initial Mix	5 min	10 min	30 Min
MAXIMUM PID (ppm)					
MAXIMUM TEMP (øC)					
OTHER:					

PENETROMETER ANALYSES					
CURE TIME (Days)	3	5	7	7	14
PENETROMETER (tons/ft <sup>2</sup> )	>4.5	>4.5	>4.5		

VOLUMETRIC EXPANSION	
INITIAL HEIGHT (in):	FINAL HEIGHT (in):
VOLUMETRIC EXPANSION (%):	

# MIX DEVELOPMENT DATA SHEET

PROJECT: Norwich MGP Site MIX No. 0301-005  
 PROJECT No.: SE-0301  
 MIXING DATE: 5-May-09 MIXED BY: SEM/RLS

UNTREATED MATERIAL TYPE	Sand/Silt	
WEIGHT OF UNTREATED MATERIAL	3,300 g	
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement	10.00 %	330.0 g
Bentonite	2.00 %	66.0 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
Water Addition	9.18 %	302.9 g

OBSERVATIONS / NOTES **Slurry**  
 Penetrometer: Days 3,5, and 7  
 UCS: Days 7,14, and 28  
 Freeze/Thaw: Day 7 or 28  
 Permeability: Day 7 or 28

MONITORING ACTIVITIES					
MONITORING ACTIVITIES	TIME PERIOD				
	Initial	Initial Mix	5 min	10 min	30 Min
MAXIMUM PID (ppm)					
MAXIMUM TEMP (øC)					
OTHER:					

PENETROMETER ANALYSES					
CURE TIME (Days)	3	5	7	7	14
PENETROMETER (tons/ft <sup>2</sup> )	>4.5	>4.5	>4.5		

VOLUMETRIC EXPANSION	
INITIAL HEIGHT (in):	FINAL HEIGHT (in):
VOLUMETRIC EXPANSION (%):	

# MIX DEVELOPMENT DATA SHEET

PROJECT: Norwich MGP Site MIX No. 0301-006  
 PROJECT No.: SE-0301  
 MIXING DATE: 5-May-09 MIXED BY: SEM/RLS

UNTREATED MATERIAL TYPE	Sand/Silt	
WEIGHT OF UNTREATED MATERIAL	3,300 g	
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement	5.00 %	165.0 g
Cement Kiln Dust	10.00 %	330.0 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
Water Addition	9.3 %	306.8 g

## OBSERVATIONS / NOTES **Slurry**

Penetrometer: Days 3,5, and 7  
 UCS: Days 7,14, and 28  
 Freeze/Thaw: Day 7 or 28  
 Permeability: Day 7 or 28

## MONITORING ACTIVITIES

MONITORING ACTIVITIES	TIME PERIOD				
	Initial	Initial Mix	5 min	10 min	30 Min
MAXIMUM PID (ppm)					
MAXIMUM TEMP (øC)					
OTHER:					

## PENETROMETER ANALYSES

CURE TIME (Days)	3	5	7	7	14
PENETROMETER (tons/ft <sup>2</sup> )	3.0	4.0	>4.5		

## VOLUMETRIC EXPANSION

INITIAL HEIGHT (in):	FINAL HEIGHT (in):
VOLUMETRIC EXPANSION (%):	



# MIX DEVELOPMENT DATA SHEET

PROJECT: Norwich MGP Site MIX No. 0301-007  
 PROJECT No.: SE-0301  
 MIXING DATE: 6-May-09 MIXED BY: SEM/RLS

UNTREATED MATERIAL TYPE	Sand/Silt	
WEIGHT OF UNTREATED MATERIAL	3,300 g	
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement	5.00 %	165.0 g
Cement Kiln Dust	15.00 %	495.0 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
Water Addition	18.92 %	624.4 g

OBSERVATIONS / NOTES **Slurry**  
 Penetrometer: Days 3,5, and 7  
 UCS: Days 7,14, and 28  
 Freeze/Thaw: Day 7 or 28  
 Permeability: Day 7 or 28

MONITORING ACTIVITIES					
MONITORING ACTIVITIES	TIME PERIOD				
	Initial	Initial Mix	5 min	10 min	30 Min
MAXIMUM PID (ppm)					
MAXIMUM TEMP (øC)					
OTHER:					

PENETROMETER ANALYSES					
CURE TIME (Days)	3	5	7	7	14
PENETROMETER (tons/ft <sup>2</sup> )	3.0	4.25	>4.5		

VOLUMETRIC EXPANSION	
INITIAL HEIGHT (in):	FINAL HEIGHT (in):
VOLUMETRIC EXPANSION (%):	

# MIX DEVELOPMENT DATA SHEET

PROJECT: Norwich MGP Site MIX No. 0301-008

PROJECT No.: SE-0301

MIXING DATE: 6-May-09 MIXED BY: SEM/RLS

UNTREATED MATERIAL TYPE	Sand/Silt	
WEIGHT OF UNTREATED MATERIAL	3,300 g	
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement	5.00 %	165.0 g
Cement Kiln Dust	25.00 %	825.0 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
Water Addition	26.71 %	881.5 g

## OBSERVATIONS / NOTES **Slurry**

Penetrometer: Days 3,5, and 7  
 UCS: Days 7,14, and 28  
 Freeze/Thaw: Day 7 or 28  
 Permeability: Day 7 or 28

## MONITORING ACTIVITIES

MONITORING ACTIVITIES	TIME PERIOD				
	Initial	Initial Mix	5 min	10 min	30 Min
MAXIMUM PID (ppm)					
MAXIMUM TEMP (øC)					
OTHER:					

## PENETROMETER ANALYSES

CURE TIME (Days)	3	5	7	7	14
PENETROMETER (tons/ft <sup>2</sup> )	3.5	4.25	>4.5		

## VOLUMETRIC EXPANSION

INITIAL HEIGHT (in):	FINAL HEIGHT (in):
VOLUMETRIC EXPANSION (%):	

# MIX DEVELOPMENT DATA SHEET

PROJECT: Norwich MGP Site MIX No. 0301-009  
 PROJECT No.: SE-0301  
 MIXING DATE: 6-May-09 MIXED BY: SEM/RLS

UNTREATED MATERIAL TYPE	Sand/Silt	
WEIGHT OF UNTREATED MATERIAL	3,300 g	
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement	5.00 %	165.0 g
Cement Kiln Dust	15.00 %	495.0 g
Bentonite	1.00 %	33.0 g
	%	0.0 g
	%	0.0 g
Water Addition	19.73 %	651.2 g

## OBSERVATIONS / NOTES **Slurry**

Penetrometer: Days 3,5, and 7  
 UCS: Days 7,14, and 28  
 Freeze/Thaw: Day 7 or 28  
 Permeability: Day 7 or 28

## MONITORING ACTIVITIES

MONITORING ACTIVITIES	TIME PERIOD				
	Initial	Initial Mix	5 min	10 min	30 Min
MAXIMUM PID (ppm)					
MAXIMUM TEMP (øC)					
OTHER:					

## PENETROMETER ANALYSES

CURE TIME (Days)	3	5	7	7	14
PENETROMETER (tons/ft <sup>2</sup> )	4.0	4.25	>4.5		

## VOLUMETRIC EXPANSION

INITIAL HEIGHT (in):	FINAL HEIGHT (in):
VOLUMETRIC EXPANSION (%):	

# MIX DEVELOPMENT DATA SHEET

PROJECT: Norwich MGP Site MIX No. 0301-010  
 PROJECT No.: SE-0301  
 MIXING DATE: 7-May-09 MIXED BY: SEM/RLS

UNTREATED MATERIAL TYPE	Sand/Silt	
WEIGHT OF UNTREATED MATERIAL	3,300 g	
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement	5.00 %	165.0 g
Cement Kiln Dust	15.00 %	495.0 g
Bentonite	2.00 %	66.0 g
	%	0.0 g
	%	0.0 g
Water Addition	21.14 %	697.7 g

## OBSERVATIONS / NOTES **Slurry**

Penetrometer: Days 3,5, and 7  
 UCS: Days 7,14, and 28  
 Freeze/Thaw: Day 7 or 28  
 Permeability: Day 7 or 28

## MONITORING ACTIVITIES

MONITORING ACTIVITIES	TIME PERIOD				
	Initial	Initial Mix	5 min	10 min	30 Min
MAXIMUM PID (ppm)					
MAXIMUM TEMP (øC)					
OTHER:					

## PENETROMETER ANALYSES

CURE TIME (Days)	3	5	7	7	14
PENETROMETER (tons/ft <sup>2</sup> )	3.5	4.25	>4.5		

## VOLUMETRIC EXPANSION

INITIAL HEIGHT (in):	FINAL HEIGHT (in):
VOLUMETRIC EXPANSION (%):	

# MIX DEVELOPMENT DATA SHEET

PROJECT: Norwich MGP Site MIX No. 0301-011  
 PROJECT No.: SE-0301  
 MIXING DATE: 1-May-09 MIXED BY: SEM/RLS

UNTREATED MATERIAL TYPE	Sand/Gravel	
WEIGHT OF UNTREATED MATERIAL	4,200 g	
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement	5.00 %	210.0 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
Water Addition	2.02 %	85.0 g

OBSERVATIONS / NOTES **Slurry**  
 Penetrometer: Days 3,5, and 7  
 UCS: Days 7,14, and 28  
 Freeze/Thaw: Day 7 or 28  
 Permeability: Day 7 or 28

MONITORING ACTIVITIES					
MONITORING ACTIVITIES	TIME PERIOD				
	Initial	Initial Mix	5 min	10 min	30 Min
MAXIMUM PID (ppm)					
MAXIMUM TEMP (øC)					
OTHER:					

PENETROMETER ANALYSES					
CURE TIME (Days)	3	5	7	7	14
PENETROMETER (tons/ft <sup>2</sup> )	>4.5	>4.5	>4.5		

VOLUMETRIC EXPANSION	
INITIAL HEIGHT (in):	FINAL HEIGHT (in):
VOLUMETRIC EXPANSION (%):	

# MIX DEVELOPMENT DATA SHEET

PROJECT: Norwich MGP Site MIX No. 0301-012  
 PROJECT No.: SE-0301  
 MIXING DATE: 1-May-09 MIXED BY: SEM/RLS

UNTREATED MATERIAL TYPE	Sand/Gravel	
WEIGHT OF UNTREATED MATERIAL	4,200 g	
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement	10.00 %	420.0 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
Water Addition	4.12 %	172.92 g

OBSERVATIONS / NOTES **Slurry**  
 Penetrometer: Days 3,5, and 7  
 UCS: Days 7,14, and 28  
 Freeze/Thaw: Day 7 or 28  
 Permeability: Day 7 or 28

MONITORING ACTIVITIES					
MONITORING ACTIVITIES	TIME PERIOD				
	Initial	Initial Mix	5 min	10 min	30 Min
MAXIMUM PID (ppm)					
MAXIMUM TEMP (øC)					
OTHER:					

PENETROMETER ANALYSES					
CURE TIME (Days)	3	5	7	7	14
PENETROMETER (tons/ftý)	>4.5	>4.5	>4.5		

VOLUMETRIC EXPANSION	
INITIAL HEIGHT (in):	FINAL HEIGHT (in):
VOLUMETRIC EXPANSION (%):	

# MIX DEVELOPMENT DATA SHEET

PROJECT: Norwich MGP Site MIX No. 0301-013  
 PROJECT No.: SE-0301  
 MIXING DATE: 4-May-09 MIXED BY: SEM/RSL

UNTREATED MATERIAL TYPE	Sand/Gravel	
WEIGHT OF UNTREATED MATERIAL	4,200 g	
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement	15.00 %	630.0 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
Water Addition	6.39 %	268.24 g

OBSERVATIONS / NOTES **Slurry**  
 Penetrometer: Days 3,5, and 7  
 UCS: Days 7,14, and 28  
 Freeze/Thaw: Day 7 or 28  
 Permeability: Day 7 or 28

MONITORING ACTIVITIES					
MONITORING ACTIVITIES	TIME PERIOD				
	Initial	Initial Mix	5 min	10 min	30 Min
MAXIMUM PID (ppm)					
MAXIMUM TEMP (øC)					
OTHER:					

PENETROMETER ANALYSES					
CURE TIME (Days)	3	5	7	7	14
PENETROMETER (tons/ft <sup>2</sup> )	>4.5	>4.5	>4.5		

VOLUMETRIC EXPANSION	
INITIAL HEIGHT (in):	FINAL HEIGHT (in):
VOLUMETRIC EXPANSION (%):	

# MIX DEVELOPMENT DATA SHEET

PROJECT: Norwich MGP Site MIX No. 0301-014  
 PROJECT No.: SE-0301  
 MIXING DATE: 5-May-09 MIXED BY: SEM/RSL

UNTREATED MATERIAL TYPE	Sand/Gravel	
WEIGHT OF UNTREATED MATERIAL	4,200 g	
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement	10.00 %	420.0 g
Bentonite	1.00 %	42.0 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
Water Addition	7.31 %	307.1 g

OBSERVATIONS / NOTES **Slurry**  
 Penetrometer: Days 3,5, and 7  
 UCS: Days 7,14, and 28  
 Freeze/Thaw: Day 7 or 28  
 Permeability: Day 7 or 28

MONITORING ACTIVITIES					
MONITORING ACTIVITIES	TIME PERIOD				
	Initial	Initial Mix	5 min	10 min	30 Min
MAXIMUM PID (ppm)					
MAXIMUM TEMP (øC)					
OTHER:					

PENETROMETER ANALYSES					
CURE TIME (Days)	3	5	7	7	14
PENETROMETER (tons/ft <sup>2</sup> )	4.0	>4.5	>4.5		

VOLUMETRIC EXPANSION	
INITIAL HEIGHT (in):	FINAL HEIGHT (in):
VOLUMETRIC EXPANSION (%):	



# MIX DEVELOPMENT DATA SHEET

PROJECT: Norwich MGP Site MIX No. 0301-015  
 PROJECT No.: SE-0301  
 MIXING DATE: 5-May-09 MIXED BY: SEM/RSL

UNTREATED MATERIAL TYPE	Sand/Gravel	
WEIGHT OF UNTREATED MATERIAL	4,200 g	
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement	10.00 %	420.0 g
Bentonite	2.00 %	84.0 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
Water Addition	9.05 %	380.2 g

OBSERVATIONS / NOTES **Slurry**  
 Penetrometer: Days 3,5, and 7  
 UCS: Days 7,14, and 28  
 Freeze/Thaw: Day 7 or 28  
 Permeability: Day 7 or 28

MONITORING ACTIVITIES					
MONITORING ACTIVITIES	TIME PERIOD				
	Initial	Initial Mix	5 min	10 min	30 Min
MAXIMUM PID (ppm)					
MAXIMUM TEMP (øC)					
OTHER:					

PENETROMETER ANALYSES					
CURE TIME (Days)	3	5	7	7	14
PENETROMETER (tons/ftý)	4.25	>4.5	>4.5		

VOLUMETRIC EXPANSION	
INITIAL HEIGHT (in):	FINAL HEIGHT (in):
VOLUMETRIC EXPANSION (%):	

# MIX DEVELOPMENT DATA SHEET

PROJECT: Norwich MGP Site MIX No. 0301-016  
 PROJECT No.: SE-0301  
 MIXING DATE: 5-May-09 MIXED BY: SEM/RSL

UNTREATED MATERIAL TYPE	Sand/Gravel	
WEIGHT OF UNTREATED MATERIAL	4,200 g	
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement	5.00 %	210.0 g
Cement Kiln Dust	10.00 %	420.0 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
Water Addition	12.09 %	508.1 g

OBSERVATIONS / NOTES **Slurry**  
 Penetrometer: Days 3,5, and 7  
 UCS: Days 7,14, and 28  
 Freeze/Thaw: Day 7 or 28  
 Permeability: Day 7 or 28

MONITORING ACTIVITIES					
MONITORING ACTIVITIES	TIME PERIOD				
	Initial	Initial Mix	5 min	10 min	30 Min
MAXIMUM PID (ppm)					
MAXIMUM TEMP (øC)					
OTHER:					

PENETROMETER ANALYSES					
CURE TIME (Days)	3	5	7	7	14
PENETROMETER (tons/ftý)	3.75	4.25	>4.5		

VOLUMETRIC EXPANSION	
INITIAL HEIGHT (in):	FINAL HEIGHT (in):
VOLUMETRIC EXPANSION (%):	

# MIX DEVELOPMENT DATA SHEET

PROJECT: Norwich MGP Site MIX No. 0301-017  
 PROJECT No.: SE-0301  
 MIXING DATE: 7-May-09 MIXED BY: SEM/RSL

UNTREATED MATERIAL TYPE	Sand/Gravel	
WEIGHT OF UNTREATED MATERIAL	3,112 g	
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement	5.00 %	155.6 g
Cement Kiln Dust	15.00 %	466.8 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
Water Addition	18.95 %	589.8 g

## OBSERVATIONS / NOTES **Slurry**

Penetrometer: Days 3,5, and 7  
 UCS: Days 7,14, and 28  
 Freeze/Thaw: Day 7 or 28  
 Permeability: Day 7 or 28

## MONITORING ACTIVITIES

MONITORING ACTIVITIES	TIME PERIOD				
	Initial	Initial Mix	5 min	10 min	30 Min
MAXIMUM PID (ppm)					
MAXIMUM TEMP (°C)					
OTHER:					

## PENETROMETER ANALYSES

CURE TIME (Days)	3	5	7	7	14
PENETROMETER (tons/ft <sup>2</sup> )	3.75	4.25	>4.5		

## VOLUMETRIC EXPANSION

INITIAL HEIGHT (in):	FINAL HEIGHT (in):
VOLUMETRIC EXPANSION (%):	

# MIX DEVELOPMENT DATA SHEET

PROJECT: Norwich MGP Site MIX No. 0301-018  
 PROJECT No.: SE-0301  
 MIXING DATE: 6-May-09 MIXED BY: SEM/RSL

UNTREATED MATERIAL TYPE	Sand/Gravel	
WEIGHT OF UNTREATED MATERIAL	4,200 g	
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement	5.00 %	210.0 g
Cement Kiln Dust	25.00 %	1050.0 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
Water Addition	23.9 %	1003.5 g

## OBSERVATIONS / NOTES **Slurry**

Penetrometer: Days 3,5, and 7  
 UCS: Days 7,14, and 28  
 Freeze/Thaw: Day 7 or 28  
 Permeability: Day 7 or 28

## MONITORING ACTIVITIES

MONITORING ACTIVITIES	TIME PERIOD				
	Initial	Initial Mix	5 min	10 min	30 Min
MAXIMUM PID (ppm)					
MAXIMUM TEMP (øC)					
OTHER:					

## PENETROMETER ANALYSES

CURE TIME (Days)	3	5	7	7	14
PENETROMETER (tons/ft <sup>2</sup> )	3.5	4.25	>4.5		

## VOLUMETRIC EXPANSION

INITIAL HEIGHT (in):	FINAL HEIGHT (in):
VOLUMETRIC EXPANSION (%):	

# MIX DEVELOPMENT DATA SHEET

PROJECT: Norwich MGP Site MIX No. 0301-019  
 PROJECT No.: SE-0301  
 MIXING DATE: 6-May-09 MIXED BY: SEM/RSL

UNTREATED MATERIAL TYPE	Sand/Gravel	
WEIGHT OF UNTREATED MATERIAL	4,200 g	
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement	5.00 %	210.0 g
Cement Kiln Dust	15.00 %	630.0 g
Bentonite	1.00 %	42.0 g
	%	0.0 g
	%	0.0 g
Water Addition	18.76 %	787.9 g

## OBSERVATIONS / NOTES **Slurry**

Penetrometer: Days 3,5, and 7  
 UCS: Days 7,14, and 28  
 Freeze/Thaw: Day 7 or 28  
 Permeability: Day 7 or 28

## MONITORING ACTIVITIES

MONITORING ACTIVITIES	TIME PERIOD				
	Initial	Initial Mix	5 min	10 min	30 Min
MAXIMUM PID (ppm)					
MAXIMUM TEMP (°C)					
OTHER:					

## PENETROMETER ANALYSES

CURE TIME (Days)	3	5	7	7	14
PENETROMETER (tons/ft <sup>2</sup> )	4.0	4.5	>4.5		

## VOLUMETRIC EXPANSION

INITIAL HEIGHT (in):	FINAL HEIGHT (in):
VOLUMETRIC EXPANSION (%):	

# MIX DEVELOPMENT DATA SHEET

PROJECT: Norwich MGP Site MIX No. 0301-020  
 PROJECT No.: SE-0301  
 MIXING DATE: 6-May-09 MIXED BY: SEM/RSL

UNTREATED MATERIAL TYPE	Sand/Gravel	
WEIGHT OF UNTREATED MATERIAL	4,200 g	
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement	5.00 %	210.0 g
Cement Kiln Dust	15.00 %	630.0 g
Bentonite	2.00 %	84.0 g
	%	0.0 g
	%	0.0 g
Water Addition	21.35 %	896.8 g

OBSERVATIONS / NOTES **Slurry**  
 Penetrometer: Days 3,5, and 7  
 UCS: Days 7,14, and 28  
 Freeze/Thaw: Day 7 or 28  
 Permeability: Day 7 or 28

MONITORING ACTIVITIES					
MONITORING ACTIVITIES	TIME PERIOD				
	Initial	Initial Mix	5 min	10 min	30 Min
MAXIMUM PID (ppm)					
MAXIMUM TEMP (øC)					
OTHER:					

PENETROMETER ANALYSES					
CURE TIME (Days)	3	5	7	7	14
PENETROMETER (tons/ftý)	4.25	>4.5	>4.5		

VOLUMETRIC EXPANSION	
INITIAL HEIGHT (in):	FINAL HEIGHT (in):
VOLUMETRIC EXPANSION (%):	

# MIX DEVELOPMENT DATA SHEET

PROJECT: Norwich MGP Site MIX No. 0301-021  
 PROJECT No.: SE-0301  
 MIXING DATE: 28-Jul-09 MIXED BY: MMD

UNTREATED MATERIAL TYPE	Sand/Silt	
WEIGHT OF UNTREATED MATERIAL	600 g	
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement	7.50 %	45.0 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
Water Addition	3.08 %	18.48 g

OBSERVATIONS / NOTES **Slurry**

UCS @ 28 days

Permeability @ 28 days

## MONITORING ACTIVITIES

MONITORING ACTIVITIES	TIME PERIOD				
	Initial	Initial Mix	5 min	10 min	30 Min
MAXIMUM PID (ppm)					
MAXIMUM TEMP (°C)					
OTHER:					

## PENETROMETER ANALYSES

CURE TIME (Days)	1	3	7	7	14
PENETROMETER (tons/ft <sup>2</sup> )					

## VOLUMETRIC EXPANSION

INITIAL HEIGHT (in):	FINAL HEIGHT (in):
VOLUMETRIC EXPANSION (%):	

# MIX DEVELOPMENT DATA SHEET

PROJECT: Norwich MGP Site MIX No. 0301-022  
 PROJECT No.: SE-0301  
 MIXING DATE: 29-Jul-09 MIXED BY: MMD

UNTREATED MATERIAL TYPE	Sand/Silt	
WEIGHT OF UNTREATED MATERIAL	600 g	
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement	7.50 %	45.0 g
Cement Kiln Dust	10.00 %	60.0 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
Water Addition	16.65 %	99.92 g

OBSERVATIONS / NOTES **Slurry**

UCS @ 28 days  
 Permeability @ 28 days

MONITORING ACTIVITIES					
MONITORING ACTIVITIES	TIME PERIOD				
	Initial	Initial Mix	5 min	10 min	30 Min
MAXIMUM PID (ppm)					
MAXIMUM TEMP (°C)					
OTHER:					

PENETROMETER ANALYSES					
CURE TIME (Days)	1	3	7	7	14
PENETROMETER (tons/ft <sup>2</sup> )					

VOLUMETRIC EXPANSION	
INITIAL HEIGHT (in):	FINAL HEIGHT (in):
VOLUMETRIC EXPANSION (%):	



# MIX DEVELOPMENT DATA SHEET

PROJECT: Norwich MGP Site MIX No. 0301-023  
 PROJECT No.: SE-0301  
 MIXING DATE: 29-Jul-09 MIXED BY: MMD

UNTREATED MATERIAL TYPE	Sand/Silt	
WEIGHT OF UNTREATED MATERIAL	600 g	
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement	10.00 %	60.0 g
Cement Kiln Dust	10.00 %	60.0 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
Water Addition	12.96 %	77.76 g

OBSERVATIONS / NOTES **Slurry**

UCS @ 28 days  
 Permeability @ 28 days

MONITORING ACTIVITIES					
MONITORING ACTIVITIES	TIME PERIOD				
	Initial	Initial Mix	5 min	10 min	30 Min
MAXIMUM PID (ppm)					
MAXIMUM TEMP (°C)					
OTHER:					

PENETROMETER ANALYSES					
CURE TIME (Days)	1	3	7	7	14
PENETROMETER (tons/ft <sup>2</sup> )					

VOLUMETRIC EXPANSION	
INITIAL HEIGHT (in):	FINAL HEIGHT (in):
VOLUMETRIC EXPANSION (%):	

# MIX DEVELOPMENT DATA SHEET

PROJECT: Norwich MGP Site MIX No. 0301-024  
 PROJECT No.: SE-0301  
 MIXING DATE: 29-Jul-09 MIXED BY: MMD

UNTREATED MATERIAL TYPE	Sand/Silt	
WEIGHT OF UNTREATED MATERIAL	600 g	
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement	10.00 %	60.0 g
Cement Kiln Dust	15.00 %	90.0 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
Water Addition	15.25 %	91.52 g

OBSERVATIONS / NOTES **Slurry**

UCS @ 28 days  
 Permeability @ 28 days

MONITORING ACTIVITIES					
MONITORING ACTIVITIES	TIME PERIOD				
	Initial	Initial Mix	5 min	10 min	30 Min
MAXIMUM PID (ppm)					
MAXIMUM TEMP (°C)					
OTHER:					

PENETROMETER ANALYSES					
CURE TIME (Days)	1	3	7	7	14
PENETROMETER (tons/ft <sup>2</sup> )					

VOLUMETRIC EXPANSION	
INITIAL HEIGHT (in):	FINAL HEIGHT (in):
VOLUMETRIC EXPANSION (%):	

# MIX DEVELOPMENT DATA SHEET

PROJECT: Norwich MGP Site MIX No. 0301-025  
 PROJECT No.: SE-0301  
 MIXING DATE: 29-Jul-09 MIXED BY: MMD

UNTREATED MATERIAL TYPE	Sand/Silt	
WEIGHT OF UNTREATED MATERIAL	600 g	
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement	7.50 %	45.0 g
Cement Kiln Dust	15.00 %	90.0 g
Bentonite	1.00 %	6.0 g
	%	0.0 g
	%	0.0 g
Water Addition	15.19 %	91.12 g

OBSERVATIONS / NOTES **Slurry**

UCS @ 28 days  
 Permeability @ 28 days

MONITORING ACTIVITIES					
MONITORING ACTIVITIES	TIME PERIOD				
	Initial	Initial Mix	5 min	10 min	30 Min
MAXIMUM PID (ppm)					
MAXIMUM TEMP (°C)					
OTHER:					

PENETROMETER ANALYSES					
CURE TIME (Days)	1	3	7	7	14
PENETROMETER (tons/ft <sup>2</sup> )					

VOLUMETRIC EXPANSION	
INITIAL HEIGHT (in):	FINAL HEIGHT (in):
VOLUMETRIC EXPANSION (%):	

# MIX DEVELOPMENT DATA SHEET

PROJECT: Norwich MGP Site MIX No. 0301-026  
 PROJECT No.: SE-0301  
 MIXING DATE: 29-Jul-09 MIXED BY: MMD

UNTREATED MATERIAL TYPE	Sand/Silt	
WEIGHT OF UNTREATED MATERIAL	600 g	
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement	10.00 %	60.0 g
Cement Kiln Dust	15.00 %	90.0 g
Bentonite	1.00 %	6.0 g
	%	0.0 g
	%	0.0 g
Water Addition	19.17 %	115.02 g

OBSERVATIONS / NOTES **Slurry**

UCS @28 days  
 Permeability @ 28 days

MONITORING ACTIVITIES					
MONITORING ACTIVITIES	TIME PERIOD				
	Initial	Initial Mix	5 min	10 min	30 Min
MAXIMUM PID (ppm)					
MAXIMUM TEMP (°C)					
OTHER:					

PENETROMETER ANALYSES					
CURE TIME (Days)	1	3	7	7	14
PENETROMETER (tons/ft <sup>2</sup> )					

VOLUMETRIC EXPANSION	
INITIAL HEIGHT (in):	FINAL HEIGHT (in):
VOLUMETRIC EXPANSION (%):	

# MIX DEVELOPMENT DATA SHEET

PROJECT: Norwich MGP Site MIX No. 0301-027  
 PROJECT No.: SE-0301  
 MIXING DATE: 29-Jul-09 MIXED BY: MMD

UNTREATED MATERIAL TYPE	Sand/Gravel	
WEIGHT OF UNTREATED MATERIAL	600 g	
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement	5.00 %	30.0 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
Water Addition	2.92 %	17.5 g

OBSERVATIONS / NOTES **Slurry**

UCS @ 28 days  
 Permeability @ 28 days

MONITORING ACTIVITIES					
MONITORING ACTIVITIES	TIME PERIOD				
	Initial	Initial Mix	5 min	10 min	30 Min
MAXIMUM PID (ppm)					
MAXIMUM TEMP (°C)					
OTHER:					

PENETROMETER ANALYSES					
CURE TIME (Days)	1	3	7	7	14
PENETROMETER (tons/ft <sup>2</sup> )					

VOLUMETRIC EXPANSION	
INITIAL HEIGHT (in):	FINAL HEIGHT (in):
VOLUMETRIC EXPANSION (%):	

# MIX DEVELOPMENT DATA SHEET

PROJECT: Norwich MGP Site MIX No. 0301-028  
 PROJECT No.: SE-0301  
 MIXING DATE: 29-Jul-09 MIXED BY: MMD

UNTREATED MATERIAL TYPE	Sand/Gravel	
WEIGHT OF UNTREATED MATERIAL	600 g	
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement	7.50 %	45.0 g
Bentonite	1.00 %	6.0 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
Water Addition	4.67 %	28.0 g

OBSERVATIONS / NOTES **Slurry**

UCS @ 28 days  
 Permeability @ 28 days

MONITORING ACTIVITIES					
MONITORING ACTIVITIES	TIME PERIOD				
	Initial	Initial Mix	5 min	10 min	30 Min
MAXIMUM PID (ppm)					
MAXIMUM TEMP (°C)					
OTHER:					

PENETROMETER ANALYSES					
CURE TIME (Days)	1	3	7	7	14
PENETROMETER (tons/ft <sup>2</sup> )					

VOLUMETRIC EXPANSION	
INITIAL HEIGHT (in):	FINAL HEIGHT (in):
VOLUMETRIC EXPANSION (%):	

# MIX DEVELOPMENT DATA SHEET

PROJECT: Norwich MGP Site MIX No. 0301-029  
 PROJECT No.: SE-0301  
 MIXING DATE: 29-Jul-09 MIXED BY: MMD

UNTREATED MATERIAL TYPE	Sand/Gravel	
WEIGHT OF UNTREATED MATERIAL	600 g	
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement	7.50 %	45.0 g
Cement Kiln Dust	10.00 %	60.0 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
Water Addition	9.92 %	59.5 g

OBSERVATIONS / NOTES **Slurry**

UCS @ 28 days  
 Permeability @ 28 days

MONITORING ACTIVITIES					
MONITORING ACTIVITIES	TIME PERIOD				
	Initial	Initial Mix	5 min	10 min	30 Min
MAXIMUM PID (ppm)					
MAXIMUM TEMP (°C)					
OTHER:					

PENETROMETER ANALYSES					
CURE TIME (Days)	1	3	7	7	14
PENETROMETER (tons/ft <sup>2</sup> )					

VOLUMETRIC EXPANSION	
INITIAL HEIGHT (in):	FINAL HEIGHT (in):
VOLUMETRIC EXPANSION (%):	

# MIX DEVELOPMENT DATA SHEET

PROJECT: Norwich MGP Site MIX No. 0301-030  
 PROJECT No.: SE-0301  
 MIXING DATE: 29-Jul-09 MIXED BY: MMD

UNTREATED MATERIAL TYPE	Sand/Gravel	
WEIGHT OF UNTREATED MATERIAL	600 g	
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement	10.00 %	60.0 g
Cement Kiln Dust	10.00 %	60.0 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
Water Addition	10.96 %	65.78 g

OBSERVATIONS / NOTES **Slurry**

UCS @ 28 days  
 Permeability @ 28 days

MONITORING ACTIVITIES					
MONITORING ACTIVITIES	TIME PERIOD				
	Initial	Initial Mix	5 min	10 min	30 Min
MAXIMUM PID (ppm)					
MAXIMUM TEMP (°C)					
OTHER:					

PENETROMETER ANALYSES					
CURE TIME (Days)	1	3	7	7	14
PENETROMETER (tons/ft <sup>2</sup> )					

VOLUMETRIC EXPANSION	
INITIAL HEIGHT (in):	FINAL HEIGHT (in):
VOLUMETRIC EXPANSION (%):	



# MIX DEVELOPMENT DATA SHEET

PROJECT: Norwich MGP Site MIX No. 0301-031  
 PROJECT No.: SE-0301  
 MIXING DATE: 29-Jul-09 MIXED BY: MMD

UNTREATED MATERIAL TYPE	Sand/Gravel	
WEIGHT OF UNTREATED MATERIAL	325 g	
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement	7.50 %	24.4 g
Cement Kiln Dust	15.00 %	48.8 g
Bentonite	1.00 %	3.3 g
	%	0.0 g
	%	0.0 g
Water Addition	11.83 %	38.46 g

OBSERVATIONS / NOTES **Slurry**

UCS @ 28 days  
 Permeability @ 28 days

MONITORING ACTIVITIES					
MONITORING ACTIVITIES	TIME PERIOD				
	Initial	Initial Mix	5 min	10 min	30 Min
MAXIMUM PID (ppm)					
MAXIMUM TEMP (°C)					
OTHER:					

PENETROMETER ANALYSES					
CURE TIME (Days)	1	3	7	7	14
PENETROMETER (tons/ft <sup>2</sup> )					

VOLUMETRIC EXPANSION	
INITIAL HEIGHT (in):	FINAL HEIGHT (in):
VOLUMETRIC EXPANSION (%):	

# MIX DEVELOPMENT DATA SHEET

PROJECT: Norwich MGP Site MIX No. 0301-032  
 PROJECT No.: SE-0301  
 MIXING DATE: 29-Jul-09 MIXED BY: MMD

UNTREATED MATERIAL TYPE	Sand/Gravel	
WEIGHT OF UNTREATED MATERIAL	325 g	
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Portland Cement	10.00 %	32.5 g
Cement Kiln Dust	15.00 %	48.8 g
Bentonite	1.00 %	3.3 g
	%	0.0 g
	%	0.0 g
Water Addition	15.89 %	51.65 g

OBSERVATIONS / NOTES **Slurry**

UCS @ 28 days

Permeability @ 28 days

MONITORING ACTIVITIES					
MONITORING ACTIVITIES	TIME PERIOD				
	Initial	Initial Mix	5 min	10 min	30 Min
MAXIMUM PID (ppm)					
MAXIMUM TEMP (°C)					
OTHER:					

PENETROMETER ANALYSES					
CURE TIME (Days)	1	3	7	7	14
PENETROMETER (tons/ft <sup>2</sup> )					

VOLUMETRIC EXPANSION	
INITIAL HEIGHT (in):	FINAL HEIGHT (in):
VOLUMETRIC EXPANSION (%):	

**APPENDIX C**  
**TREATED MATERIAL MOISTURE CONTENT AND**  
**PH TESTING**

# MOISTURE CONTENT DETERMINATION

## REPORT FORM

PROJECT: Norwich MGP Site  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-001  
TESTING DATE: 05/01/09  
TESTED BY: SEM/RSL  
TRACKING CODE: 5788\_MC

MOISTURE CONTENT (Dry & Wet Basis)			
1. MOISTURE TIN NO.	A	B	C
2. WT MOISTURE TIN (tare weight)	1.08 g	1.14 g	1.10 g
3. WT WET SOIL + TARE	23.31 g	24.01 g	25.04 g
4. WT DRY SOIL + TARE	19.29 g	19.73 g	20.44 g
5. WT WATER, Ww	4.02 g	4.28 g	4.60 g
6. WT DRY SOIL, Ws	18.21 g	18.59 g	19.34 g
7. ASTM MOISTURE CONTENT	22.08 %	23.02 %	23.78 %
8. PERCENT SOLIDS	81.92 %	81.29 %	80.79 %
9. AVERAGE ASTM MOISTURE CONTENT	22.96 %		
10. AVERAGE PERCENT SOLIDS	81.33 %		

# MATERIAL pH

EPA METHOD 9045  
DATA SHEET

PROJECT: Norwich MGP Site

PROJECT No.: SE-0301

TESTING DATE: 5/1/2009

TESTED BY: SEM/RSL

TRACKING CODE: 5788\_PH

KEMRON SAMPLE No.		MATERIAL pH
1.	0301-001	11.26
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		
Average:		11.26

# MOISTURE CONTENT DETERMINATION

## REPORT FORM

PROJECT: Norwich MGP Site  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-002  
TESTING DATE: 05/01/09  
TESTED BY: SEM/RSL  
TRACKING CODE: 5789\_MC

MOISTURE CONTENT (Dry & Wet Basis)			
1. MOISTURE TIN NO.	A	B	C
2. WT MOISTURE TIN (tare weight)	1.09 g	1.10 g	1.10 g
3. WT WET SOIL + TARE	28.11 g	29.03 g	25.45 g
4. WT DRY SOIL + TARE	22.87 g	23.78 g	21.22 g
5. WT WATER, Ww	5.24 g	5.25 g	4.23 g
6. WT DRY SOIL, Ws	21.78 g	22.68 g	20.12 g
7. ASTM MOISTURE CONTENT	24.06 %	23.15 %	21.02 %
8. PERCENT SOLIDS	80.61 %	81.20 %	82.63 %
9. AVERAGE ASTM MOISTURE CONTENT	22.74 %		
10. AVERAGE PERCENT SOLIDS	81.48 %		

# MATERIAL pH

EPA METHOD 9045  
DATA SHEET

PROJECT: Norwich MGP Site

PROJECT No.: SE-0301

TESTING DATE: 5/1/2009

TESTED BY: SEM/RSL

TRACKING CODE: 5789\_PH

KEMRON SAMPLE No.		MATERIAL pH
1.	0301-002	11.43
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		
Average:		11.43

# MOISTURE CONTENT DETERMINATION

## REPORT FORM

PROJECT: Norwich MGP Site  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-003  
TESTING DATE: 05/04/09  
TESTED BY: SEM/RSL  
TRACKING CODE: 5790\_MC

MOISTURE CONTENT (Dry & Wet Basis)			
1. MOISTURE TIN NO.	A	B	C
2. WT MOISTURE TIN (tare weight)	1.10 g	1.11 g	1.12 g
3. WT WET SOIL + TARE	26.33 g	27.33 g	29.94 g
4. WT DRY SOIL + TARE	21.15 g	21.98 g	24.05 g
5. WT WATER, Ww	5.18 g	5.35 g	5.89 g
6. WT DRY SOIL, Ws	20.05 g	20.87 g	22.93 g
7. ASTM MOISTURE CONTENT	25.84 %	25.63 %	25.69 %
8. PERCENT SOLIDS	79.47 %	79.60 %	79.56 %
9. AVERAGE ASTM MOISTURE CONTENT	25.72 %		
10. AVERAGE PERCENT SOLIDS	79.54 %		



# MATERIAL pH

EPA METHOD 9045  
DATA SHEET

PROJECT: Norwich MGP Site

PROJECT No.: SE-0301

TESTING DATE: 5/4/2009

TESTED BY: SEM/RSL

TRACKING CODE: 5790\_PH

KEMRON SAMPLE No.	MATERIAL pH
1. 0301-003	11.44
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	
Average:	11.44

# MOISTURE CONTENT DETERMINATION

## REPORT FORM

PROJECT: Norwich MGP Site  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-004  
TESTING DATE: 05/05/09  
TESTED BY: SEM/RSL  
TRACKING CODE: 5791\_MC

MOISTURE CONTENT (Dry & Wet Basis)			
1. MOISTURE TIN NO.	A	B	C
2. WT MOISTURE TIN (tare weight)	1.10 g	1.12 g	1.12 g
3. WT WET SOIL + TARE	32.67 g	22.53 g	26.05 g
4. WT DRY SOIL + TARE	26.15 g	18.06 g	20.86 g
5. WT WATER, Ww	6.52 g	4.47 g	5.19 g
6. WT DRY SOIL, Ws	25.05 g	16.94 g	19.74 g
7. ASTM MOISTURE CONTENT	26.03 %	26.39 %	26.29 %
8. PERCENT SOLIDS	79.35 %	79.12 %	79.18 %
9. AVERAGE ASTM MOISTURE CONTENT	26.24 %		
10. AVERAGE PERCENT SOLIDS	79.22 %		

# MATERIAL pH

EPA METHOD 9045  
DATA SHEET

PROJECT: Norwich MGP Site

PROJECT No.: SE-0301

TESTING DATE: 5/5/2009

TESTED BY: SEM/RSL

TRACKING CODE: 5791\_PH

KEMRON SAMPLE No.	MATERIAL pH
1. 0301-004	11.46
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	
Average:	11.46

# MOISTURE CONTENT DETERMINATION

## REPORT FORM

PROJECT: Norwich MGP Site  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-005  
TESTING DATE: 05/05/09  
TESTED BY: SEM/RSL  
TRACKING CODE: 5792\_MC

MOISTURE CONTENT (Dry & Wet Basis)			
1. MOISTURE TIN NO.	A	B	C
2. WT MOISTURE TIN (tare weight)	1.10 g	1.07 g	1.09 g
3. WT WET SOIL + TARE	29.05 g	27.61 g	25.91 g
4. WT DRY SOIL + TARE	22.79 g	21.46 g	20.44 g
5. WT WATER, Ww	6.26 g	6.15 g	5.47 g
6. WT DRY SOIL, Ws	21.69 g	20.39 g	19.35 g
7. ASTM MOISTURE CONTENT	28.86 %	30.16 %	28.27 %
8. PERCENT SOLIDS	77.60 %	76.83 %	77.96 %
9. AVERAGE ASTM MOISTURE CONTENT	29.10 %		
10. AVERAGE PERCENT SOLIDS	77.46 %		

# MATERIAL pH

EPA METHOD 9045  
DATA SHEET

PROJECT: Norwich MGP Site

PROJECT No.: SE-0301

TESTING DATE: 5/5/2009

TESTED BY: SEM/RSL

TRACKING CODE: 5792\_PH

KEMRON SAMPLE No.	MATERIAL pH
1. 0301-005	11.53
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	
Average:	11.53

# MOISTURE CONTENT DETERMINATION

## REPORT FORM

PROJECT: Norwich MGP Site  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-006  
TESTING DATE: 05/05/09  
TESTED BY: SEM/RSL  
TRACKING CODE: 5793\_MC

MOISTURE CONTENT (Dry & Wet Basis)			
1. MOISTURE TIN NO.	A	B	C
2. WT MOISTURE TIN (tare weight)	1.10 g	1.10 g	1.09 g
3. WT WET SOIL + TARE	18.26 g	22.88 g	18.63 g
4. WT DRY SOIL + TARE	14.62 g	18.35 g	14.70 g
5. WT WATER, Ww	3.64 g	4.53 g	3.93 g
6. WT DRY SOIL, Ws	13.52 g	17.25 g	13.61 g
7. ASTM MOISTURE CONTENT	26.92 %	26.26 %	28.88 %
8. PERCENT SOLIDS	78.79 %	79.20 %	77.59 %
9. AVERAGE ASTM MOISTURE CONTENT	27.35 %		
10. AVERAGE PERCENT SOLIDS	78.53 %		

# MATERIAL pH

EPA METHOD 9045  
DATA SHEET

PROJECT: Norwich MGP Site

PROJECT No.: SE-0301

TESTING DATE: 5/5/2009

TESTED BY: SEM/RSL

TRACKING CODE: 5793\_PH

KEMRON SAMPLE No.		MATERIAL pH
1.	0301-006	11.74
2.	0301-006	11.57
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		
Average:		11.66

# MOISTURE CONTENT DETERMINATION

## REPORT FORM

PROJECT: Norwich MGP Site  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-007  
TESTING DATE: 05/05/09  
TESTED BY: SEM/RSL  
TRACKING CODE: 5794\_MC

MOISTURE CONTENT (Dry & Wet Basis)			
1. MOISTURE TIN NO.	A	B	C
2. WT MOISTURE TIN (tare weight)	1.08 g	1.08 g	1.08 g
3. WT WET SOIL + TARE	34.52 g	28.61 g	31.23 g
4. WT DRY SOIL + TARE	25.81 g	21.44 g	23.36 g
5. WT WATER, Ww	8.71 g	7.17 g	7.87 g
6. WT DRY SOIL, Ws	24.73 g	20.36 g	22.28 g
7. ASTM MOISTURE CONTENT	35.22 %	35.22 %	35.32 %
8. PERCENT SOLIDS	73.95 %	73.96 %	73.90 %
9. AVERAGE ASTM MOISTURE CONTENT	35.25 %		
10. AVERAGE PERCENT SOLIDS	73.94 %		



# MATERIAL pH

EPA METHOD 9045  
DATA SHEET

PROJECT: Norwich MGP Site

PROJECT No.: SE-0301

TESTING DATE: 5/6/2009

TESTED BY: SEM/RSL

TRACKING CODE: 5794\_PH

KEMRON SAMPLE No.		MATERIAL pH
1.	0301-007	12.19
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		
Average:		12.19

# MOISTURE CONTENT DETERMINATION

## REPORT FORM

PROJECT: Norwich MGP Site  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-008  
TESTING DATE: 05/06/09  
TESTED BY: SEM/RSL  
TRACKING CODE: 5795\_MC

MOISTURE CONTENT (Dry & Wet Basis)			
1. MOISTURE TIN NO.	A	B	C
2. WT MOISTURE TIN (tare weight)	1.09 g	1.09 g	1.07 g
3. WT WET SOIL + TARE	27.38 g	30.73 g	36.37 g
4. WT DRY SOIL + TARE	19.95 g	22.65 g	26.58 g
5. WT WATER, Ww	7.43 g	8.08 g	9.79 g
6. WT DRY SOIL, Ws	18.86 g	21.56 g	25.51 g
7. ASTM MOISTURE CONTENT	39.40 %	37.48 %	38.38 %
8. PERCENT SOLIDS	71.74 %	72.74 %	72.27 %
9. AVERAGE ASTM MOISTURE CONTENT	38.42 %		
10. AVERAGE PERCENT SOLIDS	72.25 %		

# MATERIAL pH

EPA METHOD 9045  
DATA SHEET

PROJECT: Norwich MGP Site

PROJECT No.: SE-0301

TESTING DATE: 5/6/2009

TESTED BY: SEM/RSL

TRACKING CODE: 5795\_PH

KEMRON SAMPLE No.		MATERIAL pH
1.	0301-008	12.29
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		
Average:		12.29

# MOISTURE CONTENT DETERMINATION

## REPORT FORM

PROJECT: Norwich MGP Site  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-009  
TESTING DATE: 05/06/09  
TESTED BY: SEM/RSL  
TRACKING CODE: 5796\_MC

MOISTURE CONTENT (Dry & Wet Basis)			
1. MOISTURE TIN NO.	A	B	C
2. WT MOISTURE TIN (tare weight)	1.09 g	1.07 g	1.10 g
3. WT WET SOIL + TARE	23.17 g	17.20 g	14.62 g
4. WT DRY SOIL + TARE	18.13 g	12.92 g	11.03 g
5. WT WATER, Ww	5.04 g	4.28 g	3.59 g
6. WT DRY SOIL, Ws	17.04 g	11.85 g	9.93 g
7. ASTM MOISTURE CONTENT	29.58 %	36.12 %	36.15 %
8. PERCENT SOLIDS	77.17 %	73.47 %	73.45 %
9. AVERAGE ASTM MOISTURE CONTENT	33.95 %		
10. AVERAGE PERCENT SOLIDS	74.70 %		

# MATERIAL pH

EPA METHOD 9045  
DATA SHEET

PROJECT: Norwich MGP Site

PROJECT No.: SE-0301

TESTING DATE: 5/6/2009

TESTED BY: SEM/RSL

TRACKING CODE: 5795\_PH

KEMRON SAMPLE No.		MATERIAL pH
1.	0301-008	12.27
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		
Average:		12.27

# MOISTURE CONTENT DETERMINATION

## REPORT FORM

PROJECT: Norwich MGP Site  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-010  
TESTING DATE: 05/07/09  
TESTED BY: SEM/RSL  
TRACKING CODE: 5797\_MC

MOISTURE CONTENT (Dry & Wet Basis)			
1. MOISTURE TIN NO.	A	B	C
2. WT MOISTURE TIN (tare weight)	1.07 g	1.12 g	1.10 g
3. WT WET SOIL + TARE	35.37 g	29.32 g	29.71 g
4. WT DRY SOIL + TARE	26.29 g	21.49 g	21.82 g
5. WT WATER, Ww	9.08 g	7.83 g	7.89 g
6. WT DRY SOIL, Ws	25.22 g	20.37 g	20.72 g
7. ASTM MOISTURE CONTENT	36.00 %	38.44 %	38.08 %
8. PERCENT SOLIDS	73.53 %	72.23 %	72.42 %
9. AVERAGE ASTM MOISTURE CONTENT	37.51 %		
10. AVERAGE PERCENT SOLIDS	72.73 %		

# MATERIAL pH

EPA METHOD 9045  
DATA SHEET

PROJECT: Norwich MGP Site

PROJECT No.: SE-0301

TESTING DATE: 5/6/2009

TESTED BY: SEM/RSL

TRACKING CODE: 5797\_PH

KEMRON SAMPLE No.		MATERIAL pH
1.	0301-010	12.08
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		
Average:		12.08

# MOISTURE CONTENT DETERMINATION

## REPORT FORM

PROJECT: Norwich MGP Site  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-011  
TESTING DATE: 05/01/09  
TESTED BY: SEM/RSL  
TRACKING CODE: 5798\_MC

MOISTURE CONTENT (Dry & Wet Basis)			
1. MOISTURE TIN NO.	A	B	C
2. WT MOISTURE TIN (tare weight)	1.07 g	1.11 g	1.08 g
3. WT WET SOIL + TARE	31.58 g	33.73 g	30.16 g
4. WT DRY SOIL + TARE	28.35 g	29.95 g	27.13 g
5. WT WATER, Ww	3.23 g	3.78 g	3.03 g
6. WT DRY SOIL, Ws	27.28 g	28.84 g	26.05 g
7. ASTM MOISTURE CONTENT	11.84 %	13.11 %	11.63 %
8. PERCENT SOLIDS	89.41 %	88.41 %	89.58 %
9. AVERAGE ASTM MOISTURE CONTENT	12.19 %		
10. AVERAGE PERCENT SOLIDS	89.14 %		



# MATERIAL pH

EPA METHOD 9045  
DATA SHEET

PROJECT: Norwich MGP Site

PROJECT No.: SE-0301

TESTING DATE: 5/1/2009

TESTED BY: SEM/RSL

TRACKING CODE: 5798\_PH

KEMRON SAMPLE No.		MATERIAL pH
1.	0301-011	11.32
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		
Average:		11.32

# MOISTURE CONTENT DETERMINATION

## REPORT FORM

PROJECT: Norwich MGP Site  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-012  
TESTING DATE: 05/01/09  
TESTED BY: SEM/RSL  
TRACKING CODE: 5799\_MC

MOISTURE CONTENT (Dry & Wet Basis)			
1. MOISTURE TIN NO.	A	B	C
2. WT MOISTURE TIN (tare weight)	1.10 g	1.10 g	1.10 g
3. WT WET SOIL + TARE	35.65 g	29.73 g	35.76 g
4. WT DRY SOIL + TARE	31.00 g	26.31 g	31.81 g
5. WT WATER, Ww	4.65 g	3.42 g	3.95 g
6. WT DRY SOIL, Ws	29.90 g	25.21 g	30.71 g
7. ASTM MOISTURE CONTENT	15.55 %	13.57 %	12.86 %
8. PERCENT SOLIDS	86.54 %	88.05 %	88.60 %
9. AVERAGE ASTM MOISTURE CONTENT	13.99 %		
10. AVERAGE PERCENT SOLIDS	87.73 %		

# MATERIAL pH

EPA METHOD 9045  
DATA SHEET

PROJECT: Norwich MGP Site

PROJECT No.: SE-0301

TESTING DATE: 5/1/2009

TESTED BY: SEM/RSL

TRACKING CODE: 5799\_PH

KEMRON SAMPLE No.		MATERIAL pH
1.	0301-012	11.54
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		
Average:		11.54

# MOISTURE CONTENT DETERMINATION

## REPORT FORM

PROJECT: Norwich MGP Site  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-013  
TESTING DATE: 05/01/09  
TESTED BY: SEM/RSL  
TRACKING CODE: 5800\_MC

MOISTURE CONTENT (Dry & Wet Basis)			
1. MOISTURE TIN NO.	A	B	C
2. WT MOISTURE TIN (tare weight)	1.10 g	1.08 g	1.11 g
3. WT WET SOIL + TARE	27.93 g	25.79 g	26.21 g
4. WT DRY SOIL + TARE	23.23 g	21.62 g	21.81 g
5. WT WATER, Ww	4.70 g	4.17 g	4.40 g
6. WT DRY SOIL, Ws	22.13 g	20.54 g	20.70 g
7. ASTM MOISTURE CONTENT	21.24 %	20.30 %	21.26 %
8. PERCENT SOLIDS	82.48 %	83.12 %	82.47 %
9. AVERAGE ASTM MOISTURE CONTENT	20.93 %		
10. AVERAGE PERCENT SOLIDS	82.69 %		

# MATERIAL pH

EPA METHOD 9045  
DATA SHEET

PROJECT: Norwich MGP Site

PROJECT No.: SE-0301

TESTING DATE: 5/1/2009

TESTED BY: SEM/RSL

TRACKING CODE: 5800\_PH

KEMRON SAMPLE No.		MATERIAL pH
1.	0301-013	11.62
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		
Average:		11.62

# MOISTURE CONTENT DETERMINATION

## REPORT FORM

PROJECT: Norwich MGP Site  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-014  
TESTING DATE: 05/01/09  
TESTED BY: SEM/RSL  
TRACKING CODE: 5801\_MC

MOISTURE CONTENT (Dry & Wet Basis)			
1. MOISTURE TIN NO.	A	B	C
2. WT MOISTURE TIN (tare weight)	1.08 g	1.08 g	1.07 g
3. WT WET SOIL + TARE	35.73 g	37.93 g	38.30 g
4. WT DRY SOIL + TARE	29.96 g	31.80 g	31.38 g
5. WT WATER, Ww	5.77 g	6.13 g	6.92 g
6. WT DRY SOIL, Ws	28.88 g	30.72 g	30.31 g
7. ASTM MOISTURE CONTENT	19.98 %	19.95 %	22.83 %
8. PERCENT SOLIDS	83.35 %	83.36 %	81.41 %
9. AVERAGE ASTM MOISTURE CONTENT	20.92 %		
10. AVERAGE PERCENT SOLIDS	82.71 %		

# MATERIAL pH

EPA METHOD 9045  
DATA SHEET

PROJECT: Norwich MGP Site

PROJECT No.: SE-0301

TESTING DATE: 5/1/2009

TESTED BY: SEM/RSL

TRACKING CODE: 5801\_PH

KEMRON SAMPLE No.		MATERIAL pH
1.	0301-014	11.46
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		
Average:		11.46

# MOISTURE CONTENT DETERMINATION

## REPORT FORM

PROJECT: Norwich MGP Site  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-015  
TESTING DATE: 05/05/09  
TESTED BY: SEM/RSL  
TRACKING CODE: 5802\_MC

MOISTURE CONTENT (Dry & Wet Basis)			
1. MOISTURE TIN NO.	A	B	C
2. WT MOISTURE TIN (tare weight)	1.06 g	1.07 g	1.08 g
3. WT WET SOIL + TARE	39.05 g	39.05 g	38.61 g
4. WT DRY SOIL + TARE	32.07 g	32.58 g	31.63 g
5. WT WATER, W <sub>w</sub>	6.98 g	6.47 g	6.98 g
6. WT DRY SOIL, W <sub>s</sub>	31.01 g	31.51 g	30.55 g
7. ASTM MOISTURE CONTENT	22.51 %	20.53 %	22.85 %
8. PERCENT SOLIDS	81.63 %	82.96 %	81.40 %
9. AVERAGE ASTM MOISTURE CONTENT	21.96 %		
10. AVERAGE PERCENT SOLIDS	82.00 %		



# MATERIAL pH

EPA METHOD 9045  
DATA SHEET

PROJECT: Norwich MGP Site

PROJECT No.: SE-0301

TESTING DATE: 5/5/2009

TESTED BY: SEM/RSL

TRACKING CODE: 5802\_PH

KEMRON SAMPLE No.		MATERIAL pH
1.	0301-015	11.51
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		
Average:		11.51

# MOISTURE CONTENT DETERMINATION

## REPORT FORM

PROJECT: Norwich MGP Site  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-016  
TESTING DATE: 05/05/09  
TESTED BY: SEM/RSL  
TRACKING CODE: 5803\_MC

MOISTURE CONTENT (Dry & Wet Basis)			
1. MOISTURE TIN NO.	A	B	C
2. WT MOISTURE TIN (tare weight)	1.08 g	1.10 g	1.10 g
3. WT WET SOIL + TARE	32.78 g	24.22 g	28.49 g
4. WT DRY SOIL + TARE	25.75 g	18.96 g	22.90 g
5. WT WATER, Ww	7.03 g	5.26 g	5.59 g
6. WT DRY SOIL, Ws	24.67 g	17.86 g	21.80 g
7. ASTM MOISTURE CONTENT	28.50 %	29.45 %	25.64 %
8. PERCENT SOLIDS	77.82 %	77.25 %	79.59 %
9. AVERAGE ASTM MOISTURE CONTENT	27.86 %		
10. AVERAGE PERCENT SOLIDS	78.22 %		

# MATERIAL pH

EPA METHOD 9045  
DATA SHEET

PROJECT: Norwich MGP Site

PROJECT No.: SE-0301

TESTING DATE: 5/5/2009

TESTED BY: SEM/RSL

TRACKING CODE: 5803\_PH

KEMRON SAMPLE No.		MATERIAL pH
1.	0301-016	11.92
2.	0301-016	11.72
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		
Average:		11.82

# MOISTURE CONTENT DETERMINATION

## REPORT FORM

PROJECT: Norwich MGP Site  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-017  
TESTING DATE: 05/07/09  
TESTED BY: SEM/RSL  
TRACKING CODE: 5804\_MC

MOISTURE CONTENT (Dry & Wet Basis)			
1. MOISTURE TIN NO.	A	B	C
2. WT MOISTURE TIN (tare weight)	1.06 g	1.09 g	1.06 g
3. WT WET SOIL + TARE	31.54 g	35.11 g	34.49 g
4. WT DRY SOIL + TARE	25.65 g	28.62 g	27.91 g
5. WT WATER, Ww	5.89 g	6.49 g	6.58 g
6. WT DRY SOIL, Ws	24.59 g	27.53 g	26.85 g
7. ASTM MOISTURE CONTENT	23.95 %	23.57 %	24.51 %
8. PERCENT SOLIDS	80.68 %	80.92 %	80.32 %
9. AVERAGE ASTM MOISTURE CONTENT	24.01 %		
10. AVERAGE PERCENT SOLIDS	80.64 %		

# MATERIAL pH

EPA METHOD 9045  
DATA SHEET

PROJECT: Norwich MGP Site

PROJECT No.: SE-0301

TESTING DATE: 5/7/2009

TESTED BY: SEM/RSL

TRACKING CODE: 5804\_PH

KEMRON SAMPLE No.		MATERIAL pH
1.	0301-017	12.40
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		
Average:		12.40

# MOISTURE CONTENT DETERMINATION

## REPORT FORM

PROJECT: Norwich MGP Site  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-018  
TESTING DATE: 05/06/09  
TESTED BY: SEM/RSL  
TRACKING CODE: 5805\_MC

MOISTURE CONTENT (Dry & Wet Basis)			
1. MOISTURE TIN NO.	A	B	C
2. WT MOISTURE TIN (tare weight)	1.05 g	1.06 g	1.05 g
3. WT WET SOIL + TARE	38.51 g	36.28 g	39.22 g
4. WT DRY SOIL + TARE	30.46 g	27.13 g	30.81 g
5. WT WATER, Ww	8.05 g	9.15 g	8.41 g
6. WT DRY SOIL, Ws	29.41 g	26.07 g	29.76 g
7. ASTM MOISTURE CONTENT	27.37 %	35.10 %	28.26 %
8. PERCENT SOLIDS	78.51 %	74.02 %	77.97 %
9. AVERAGE ASTM MOISTURE CONTENT	30.24 %		
10. AVERAGE PERCENT SOLIDS	76.83 %		

# MATERIAL pH

EPA METHOD 9045  
DATA SHEET

PROJECT: Norwich MGP Site

PROJECT No.: SE-0301

TESTING DATE: 5/6/2009

TESTED BY: SEM/RSL

TRACKING CODE: 5805\_PH

KEMRON SAMPLE No.		MATERIAL pH
1.	0301-018	12.56
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		
Average:		12.56

# MOISTURE CONTENT DETERMINATION

## REPORT FORM

PROJECT: Norwich MGP Site  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-019  
TESTING DATE: 05/06/09  
TESTED BY: SEM/RSL  
TRACKING CODE: 5806\_MC

MOISTURE CONTENT (Dry & Wet Basis)			
1. MOISTURE TIN NO.	A	B	C
2. WT MOISTURE TIN (tare weight)	1.10 g	1.07 g	1.09 g
3. WT WET SOIL + TARE	27.50 g	35.17 g	30.90 g
4. WT DRY SOIL + TARE	22.46 g	27.85 g	25.17 g
5. WT WATER, Ww	5.04 g	7.32 g	5.73 g
6. WT DRY SOIL, Ws	21.36 g	26.78 g	24.08 g
7. ASTM MOISTURE CONTENT	23.60 %	27.33 %	23.80 %
8. PERCENT SOLIDS	80.91 %	78.53 %	80.78 %
9. AVERAGE ASTM MOISTURE CONTENT	24.91 %		
10. AVERAGE PERCENT SOLIDS	80.07 %		



# MATERIAL pH

EPA METHOD 9045  
DATA SHEET

PROJECT: Norwich MGP Site

PROJECT No.: SE-0301

TESTING DATE: 5/6/2009

TESTED BY: SEM/RSL

TRACKING CODE: 5806\_PH

KEMRON SAMPLE No.		MATERIAL pH
1.	0301-019	12.38
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		
Average:		12.38

# MOISTURE CONTENT DETERMINATION

## REPORT FORM

PROJECT: Norwich MGP Site  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-020  
TESTING DATE: 05/06/09  
TESTED BY: SEM/RSL  
TRACKING CODE: 5807\_MC

MOISTURE CONTENT (Dry & Wet Basis)			
1. MOISTURE TIN NO.	A	B	C
2. WT MOISTURE TIN (tare weight)	1.07 g	1.13 g	1.11 g
3. WT WET SOIL + TARE	24.86 g	19.31 g	18.10 g
4. WT DRY SOIL + TARE	19.34 g	14.75 g	14.13 g
5. WT WATER, Ww	5.52 g	4.56 g	3.97 g
6. WT DRY SOIL, Ws	18.27 g	13.62 g	13.02 g
7. ASTM MOISTURE CONTENT	30.21 %	33.48 %	30.49 %
8. PERCENT SOLIDS	76.80 %	74.92 %	76.63 %
9. AVERAGE ASTM MOISTURE CONTENT	31.40 %		
10. AVERAGE PERCENT SOLIDS	76.12 %		

# MATERIAL pH

EPA METHOD 9045  
DATA SHEET

PROJECT: Norwich MGP Site

PROJECT No.: SE-0301

TESTING DATE: 5/6/2009

TESTED BY: SEM/RSL

TRACKING CODE: 5807\_PH

KEMRON SAMPLE No.	MATERIAL pH
1. 0301-020	12.35
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	
Average:	12.35

**APPENDIX D**

**TREATED MATERIAL PERMEABILITY TESTING**

# PERMEABILITY ASTM D5084

## SPECIMEN CONDITIONS

Page 1 of 6

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-001  
TEST DATE: 6/1/2009

TESTED BY: SEM  
TRACKING CODE: 5879\_PM  
EQUIPMENT No.: 2

<b>MOISTURE CONTENT (Dry Basis)</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>1. MOISTURE TIN NO.</b>	0301-001	0301-001
<b>2. WT MOISTURE TIN (tare weight)</b>	0.00 <b>g</b>	230.84 <b>g</b>
<b>3. WT WET SOIL + TARE</b>	559.63 <b>g</b>	802.50 <b>g</b>
<b>4. WT DRY SOIL + TARE</b>	456.96 <b>g</b>	687.80 <b>g</b>
5. WT WATER, W <sub>w</sub>	102.67 <b>g</b>	114.70 <b>g</b>
6. WT DRY SOIL, W <sub>s</sub>	456.96 <b>g</b>	456.96 <b>g</b>
7. MOISTURE CONTENT, W	22.47 <b>%</b>	25.10 <b>%</b>

<b>SOIL SPECIMEN DIMENSIONS</b>				
<b>TRIPLICATE ANALYSES</b>	<b>DIAMETER</b>		<b>HEIGHT</b>	
	<b>INITIAL</b>	<b>FINAL</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>No. 1</b>	2.97 in.	2.98 in.	2.50 in.	2.50 in.
<b>No. 2</b>	2.98 in.	2.99 in.	2.51 in.	2.51 in.
<b>No. 3</b>	3.00 in.	2.99 in.	2.52 in.	2.52 in.
Average	2.98 in.	2.99 in.	2.51 in.	2.51 in.

<b>SPECIMEN CONDITIONS</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>Specimen WT, W<sub>o</sub></b>	<b>559.63 g</b>	<b>571.71 g</b>
Area, A <sub>o</sub>	6.99 in <sup>2</sup>	7.01 in <sup>2</sup>
Volume, V <sub>o</sub>	17.55 in <sup>3</sup>	17.58 in <sup>3</sup>
Bulk Unit Weight	121.5 lb/ft <sup>3</sup>	123.9 lb/ft <sup>3</sup>
Dry Unit Weight	99.2 lb/ft <sup>3</sup>	99.0 lb/ft <sup>3</sup>

## BACK-PRESSURE SATURATION

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-001
TEST DATE:	6/1/2009

[illegible]

\* Saturation check - no data available.

## SPECIMEN CONSOLIDATION

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-001
TEST DATE:	6/1/2009

$$\frac{\text{SEM}}{5879\_PM}$$
[illegible]

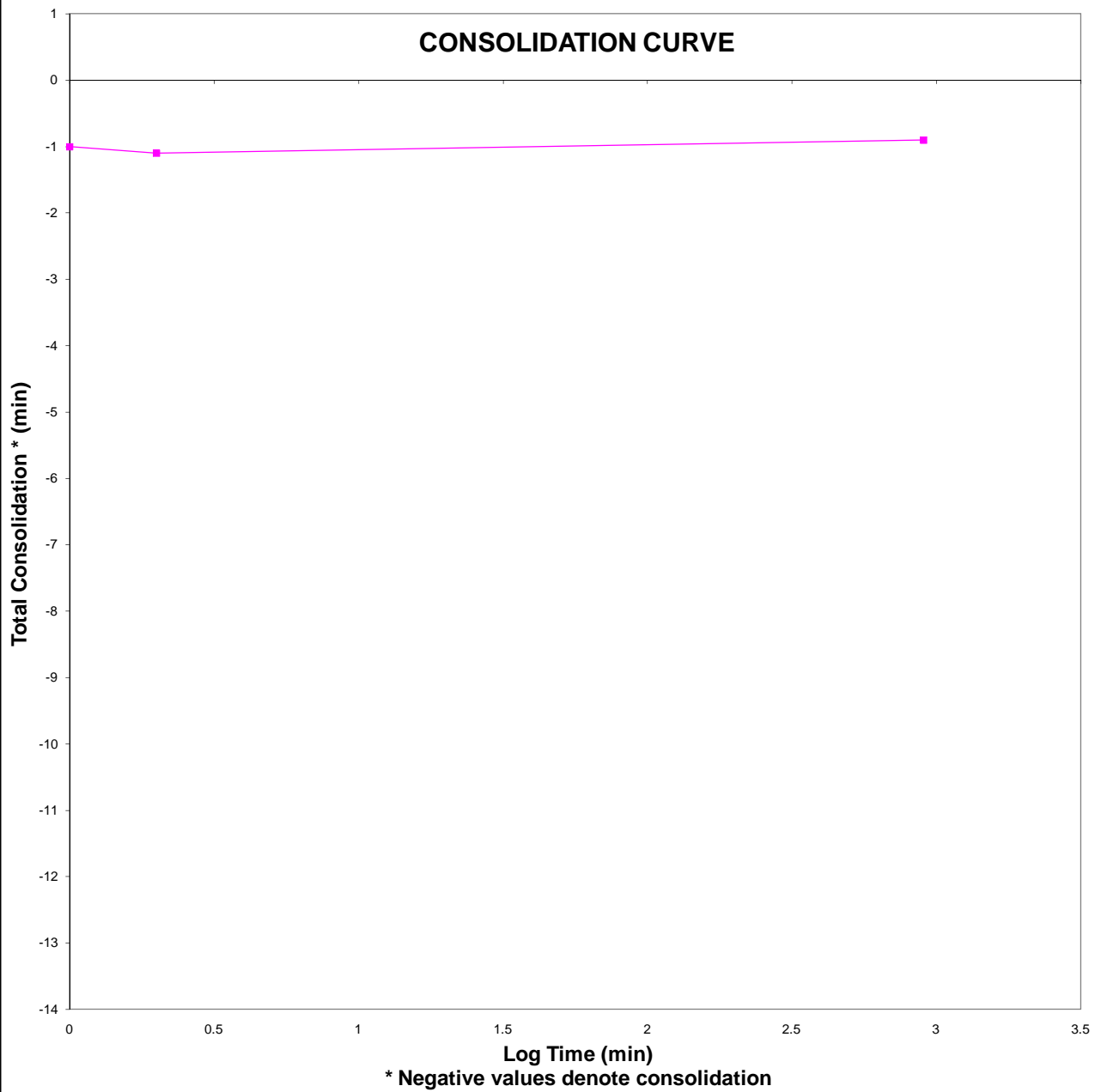
# PERMEABILITY ASTM D5084

## CONSOLIDATION CURVE

Page 4 of 6

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-001  
TEST DATE: 6/1/2009

TESTED BY: SEM  
TRACKING CODE: 5879\_PM  
EQUIPMENT No.: 2





## PERMEABILITY ASTM D5084

## TEST DATA

Page 5 of 6

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-001
TEST DATE:	6/1/2009

TESTED BY:	SEM
TRACKING CODE:	5879_PM
EQUIPMENT No.:	2

[illegible]

**TEST DATA (continued)**

Page 6 of 6

TESTED BY:	SEM
TRACKING CODE:	5879_PM
EQUIPMENT No.:	2

[illegible]

# PERMEABILITY ASTM D5084

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-001  
TEST DATE: 6/1/2009

TESTED BY: SEM  
TRACKING CODE: 5879\_PM  
EQUIPMENT No.: 2

TESTING PARAMETER	INITIAL	FINAL
BULK UNIT WEIGHT	121.5 lb/ft <sup>3</sup>	123.9 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	99.2 lb/ft <sup>3</sup>	99.0 lb/ft <sup>3</sup>
MOISTURE CONTENT	22.5 %	25.1 %
PERMEABILITY @ 20°C	7.2E-07 cm/sec	

# PERMEABILITY ASTM D5084

## SPECIMEN CONDITIONS

Page 1 of 6

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-002  
TEST DATE: 6/1/2009

TESTED BY: SEM  
TRACKING CODE: 5880\_PM  
EQUIPMENT No.: 5

<b>MOISTURE CONTENT (Dry Basis)</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>1. MOISTURE TIN NO.</b>	0301-002	0301-002
<b>2. WT MOISTURE TIN (tare weight)</b>	0.00 <b>g</b>	230.62 <b>g</b>
<b>3. WT WET SOIL + TARE</b>	459.98 <b>g</b>	701.30 <b>g</b>
<b>4. WT DRY SOIL + TARE</b>	378.39 <b>g</b>	609.01 <b>g</b>
5. WT WATER, W <sub>w</sub>	81.59 <b>g</b>	92.29 <b>g</b>
6. WT DRY SOIL, W <sub>s</sub>	378.39 <b>g</b>	378.39 <b>g</b>
7. MOISTURE CONTENT, W	21.56 <b>%</b>	24.39 <b>%</b>

<b>SOIL SPECIMEN DIMENSIONS</b>				
<b>TRIPLICATE ANALYSES</b>	<b>DIAMETER</b>		<b>HEIGHT</b>	
	<b>INITIAL</b>	<b>FINAL</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>No. 1</b>	2.96 in.	2.96 in.	2.05 in.	2.05 in.
<b>No. 2</b>	2.97 in.	2.97 in.	2.05 in.	2.06 in.
<b>No. 3</b>	2.98 in.	2.98 in.	2.06 in.	2.06 in.
Average	2.97 in.	2.97 in.	2.05 in.	2.06 in.

<b>SPECIMEN CONDITIONS</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>Specimen WT, W<sub>o</sub></b>	<b>459.98 g</b>	<b>470.68 g</b>
Area, A <sub>o</sub>	6.93 in <sup>2</sup>	6.93 in <sup>2</sup>
Volume, V <sub>o</sub>	14.23 in <sup>3</sup>	14.25 in <sup>3</sup>
Bulk Unit Weight	123.2 lb/ft <sup>3</sup>	125.8 lb/ft <sup>3</sup>
Dry Unit Weight	101.3 lb/ft <sup>3</sup>	101.2 lb/ft <sup>3</sup>

## BACK-PRESSURE SATURATION

TESTED BY:	SEM
TRACKING CODE:	5880_PM
EQUIPMENT No.:	5

\* Saturation check - no data available.

## SPECIMEN CONSOLIDATION

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-002
TEST DATE:	6/1/2009

$$\frac{\text{SEM}}{5880\_PM}$$
[illegible]

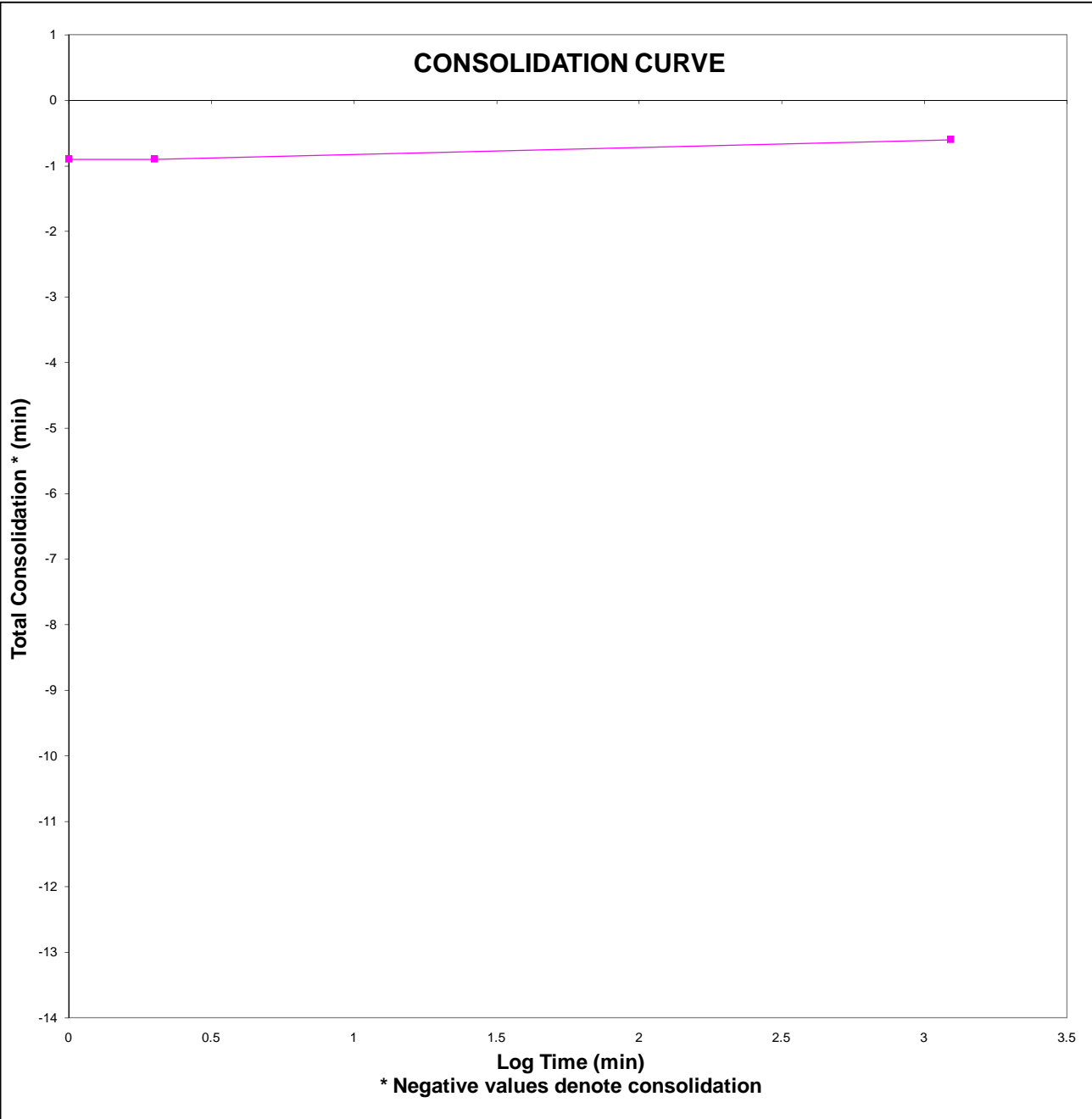
# PERMEABILITY ASTM D5084

## CONSOLIDATION CURVE

Page 4 of 6

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-002  
TEST DATE: 6/1/2009

TESTED BY: SEM  
TRACKING CODE: 5880\_PM  
EQUIPMENT No.: 5



## PERMEABILITY ASTM D5084

## TEST DATA

Page 5 of 6

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-002
TEST DATE:	6/1/2009

TESTED BY:	SEM
TRACKING CODE:	5880_PM
EQUIPMENT No.:	5

[illegible]



**TEST DATA (continued)**

Page 6 of 6

TESTED BY:	SEM
TRACKING CODE:	5880_PM
EQUIPMENT No.:	5

[illegible]

# PERMEABILITY ASTM D5084

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-002  
TEST DATE: 6/1/2009

TESTED BY: SEM  
TRACKING CODE: 5880\_PM  
EQUIPMENT No.: 5

TESTING PARAMETER	INITIAL	FINAL
BULK UNIT WEIGHT	123.2 lb/ft <sup>3</sup>	125.8 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	101.3 lb/ft <sup>3</sup>	101.2 lb/ft <sup>3</sup>
MOISTURE CONTENT	21.6 %	24.4 %
PERMEABILITY @ 20°C	1.7E-08 cm/sec	

# PERMEABILITY ASTM D5084

## SPECIMEN CONDITIONS

Page 1 of 6

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-003  
TEST DATE: 6/9/2009

TESTED BY: SEM  
TRACKING CODE: 5883\_PM  
EQUIPMENT No.: 6A

<b>MOISTURE CONTENT (Dry Basis)</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>1. MOISTURE TIN NO.</b>	0301-003	0301-003
<b>2. WT MOISTURE TIN (tare weight)</b>	0.00 g	230.12 g
<b>3. WT WET SOIL + TARE</b>	414.33 g	653.70 g
<b>4. WT DRY SOIL + TARE</b>	341.94 g	572.06 g
5. WT WATER, W <sub>w</sub>	72.39 g	81.64 g
6. WT DRY SOIL, W <sub>s</sub>	341.94 g	341.94 g
7. MOISTURE CONTENT, W	21.17 %	23.88 %

<b>SOIL SPECIMEN DIMENSIONS</b>				
<b>TRIPLICATE ANALYSES</b>	<b>DIAMETER</b>		<b>HEIGHT</b>	
	<b>INITIAL</b>	<b>FINAL</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>No. 1</b>	2.96 in.	2.96 in.	1.86 in.	1.86 in.
<b>No. 2</b>	2.96 in.	2.97 in.	1.86 in.	1.86 in.
<b>No. 3</b>	2.97 in.	2.95 in.	1.87 in.	1.87 in.
Average	2.96 in.	2.96 in.	1.86 in.	1.86 in.

<b>SPECIMEN CONDITIONS</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>Specimen WT, W<sub>o</sub></b>	<b>414.33 g</b>	<b>423.63 g</b>
Area, A <sub>o</sub>	6.90 in <sup>2</sup>	6.88 in <sup>2</sup>
Volume, V <sub>o</sub>	12.85 in <sup>3</sup>	12.82 in <sup>3</sup>
Bulk Unit Weight	122.8 lb/ft <sup>3</sup>	125.9 lb/ft <sup>3</sup>
Dry Unit Weight	101.4 lb/ft <sup>3</sup>	101.6 lb/ft <sup>3</sup>

## BACK-PRESSURE SATURATION

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-003
TEST DATE:	6/9/2009

[illegible]

\* Saturation check - no data available.

## SPECIMEN CONSOLIDATION

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-003
TEST DATE:	6/9/2009

SEM  
5883\_PM  
6A

[illegible]

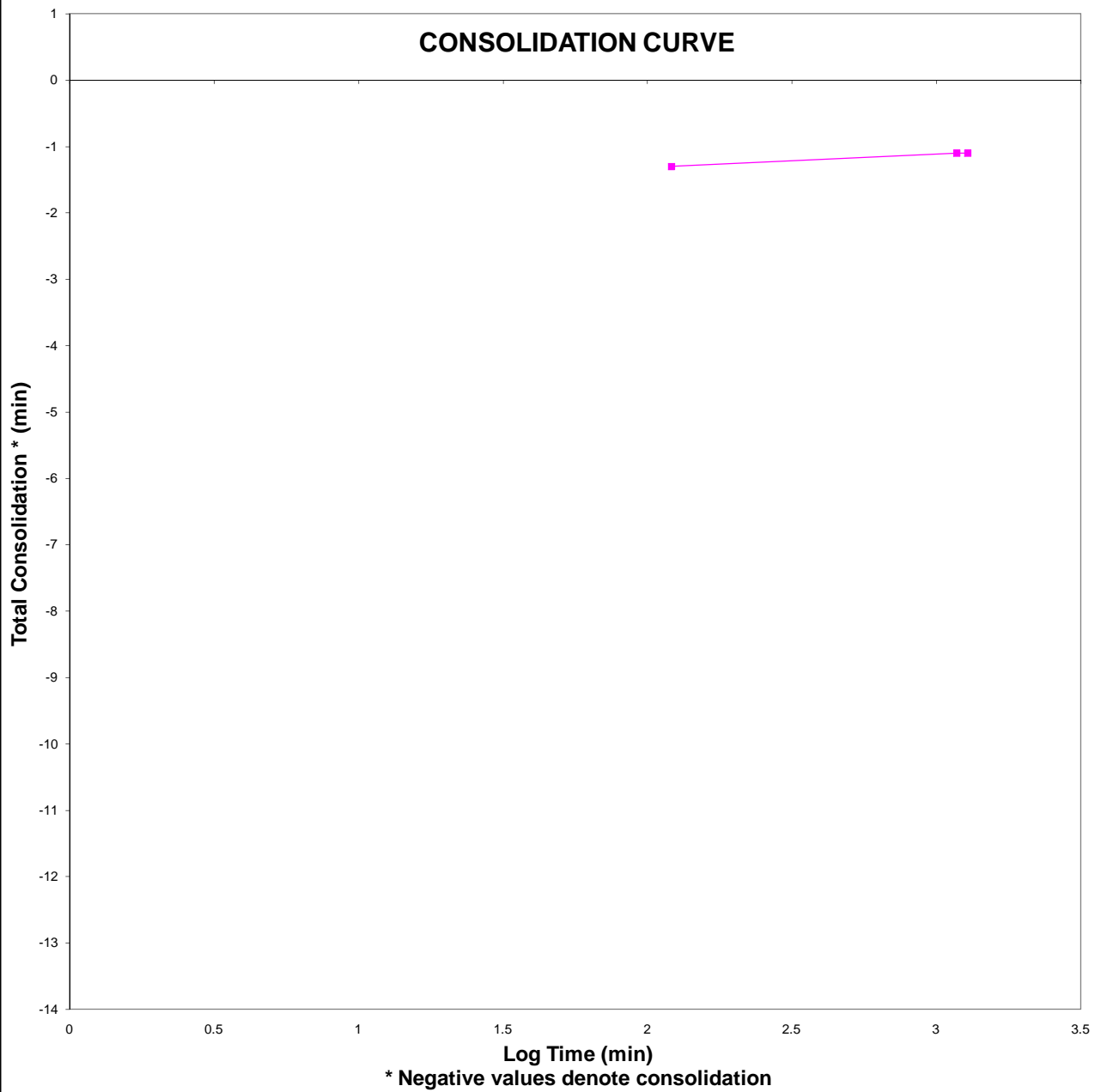
# PERMEABILITY ASTM D5084

## CONSOLIDATION CURVE

Page 4 of 6

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-003  
TEST DATE: 6/9/2009

TESTED BY: SEM  
TRACKING CODE: 5883\_PM  
EQUIPMENT No.: 6A



## PERMEABILITY ASTM D5084

## TEST DATA

Page 5 of 6

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-003
TEST DATE:	6/9/2009

TESTED BY:	SEM
TRACKING CODE:	5883_PM
EQUIPMENT No.:	6A

[illegible]

**TEST DATA (continued)**

Page 6 of 6

TESTED BY:	SEM
TRACKING CODE:	5883_PM
EQUIPMENT No.:	6A

[illegible]



# PERMEABILITY ASTM D5084

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-003  
TEST DATE: 6/9/2009

TESTED BY: SEM  
TRACKING CODE: 5883\_PM  
EQUIPMENT No.: 6A

TESTING PARAMETER	INITIAL	FINAL
BULK UNIT WEIGHT	122.8 lb/ft <sup>3</sup>	125.9 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	101.4 lb/ft <sup>3</sup>	101.6 lb/ft <sup>3</sup>
MOISTURE CONTENT	21.2 %	23.9 %
PERMEABILITY @ 20°C	3.1E-09 cm/sec	

# PERMEABILITY ASTM D5084

## SPECIMEN CONDITIONS

Page 1 of 6

PROJECT: Norwich MGP  
 PROJECT No.: SE-0301  
 SAMPLE No.: 0301-004  
 TEST DATE: 6/9/2009

TESTED BY: SEM  
 TRACKING CODE: 5894\_PM  
 EQUIPMENT No.: 7

<b>MOISTURE CONTENT (Dry Basis)</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>1. MOISTURE TIN NO.</b>	0301-004	0301-004
<b>2. WT MOISTURE TIN (tare weight)</b>	0.00 <b>g</b>	408.62 <b>g</b>
<b>3. WT WET SOIL + TARE</b>	413.45 <b>g</b>	831.30 <b>g</b>
<b>4. WT DRY SOIL + TARE</b>	332.08 <b>g</b>	740.70 <b>g</b>
5. WT WATER, W <sub>w</sub>	81.37 <b>g</b>	90.60 <b>g</b>
6. WT DRY SOIL, W <sub>s</sub>	332.08 <b>g</b>	332.08 <b>g</b>
7. MOISTURE CONTENT, W	24.50 <b>%</b>	27.28 <b>%</b>

<b>SOIL SPECIMEN DIMENSIONS</b>				
<b>TRIPLICATE</b>	<b>DIAMETER</b>		<b>HEIGHT</b>	
<b>ANALYSES</b>	<b>INITIAL</b>	<b>FINAL</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>No. 1</b>	2.96 in.	2.96 in.	1.90 in.	1.90 in.
<b>No. 2</b>	2.96 in.	2.96 in.	1.90 in.	1.90 in.
<b>No. 3</b>	2.97 in.	2.97 in.	1.91 in.	1.90 in.
Average	2.96 in.	2.96 in.	1.90 in.	1.90 in.

<b>SPECIMEN CONDITIONS</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>Specimen WT, W<sub>o</sub></b>	<b>413.45 g</b>	<b>422.70 g</b>
Area, A <sub>o</sub>	6.90 in <sup>2</sup>	6.90 in <sup>2</sup>
Volume, V <sub>o</sub>	13.13 in <sup>3</sup>	13.10 in <sup>3</sup>
Bulk Unit Weight	120.0 lb/ft <sup>3</sup>	122.9 lb/ft <sup>3</sup>
Dry Unit Weight	96.4 lb/ft <sup>3</sup>	96.5 lb/ft <sup>3</sup>

## BACK-PRESSURE SATURATION

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-004
TEST DATE:	6/9/2009

TESTED BY:	SEM
TRACKING CODE:	5894_PM
EQUIPMENT No.:	7

[illegible]

\* Saturation check - no data available.

## SPECIMEN CONSOLIDATION

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-004
TEST DATE:	6/9/2009

$$\frac{\text{SEM}}{5894\_PM}$$
[illegible]

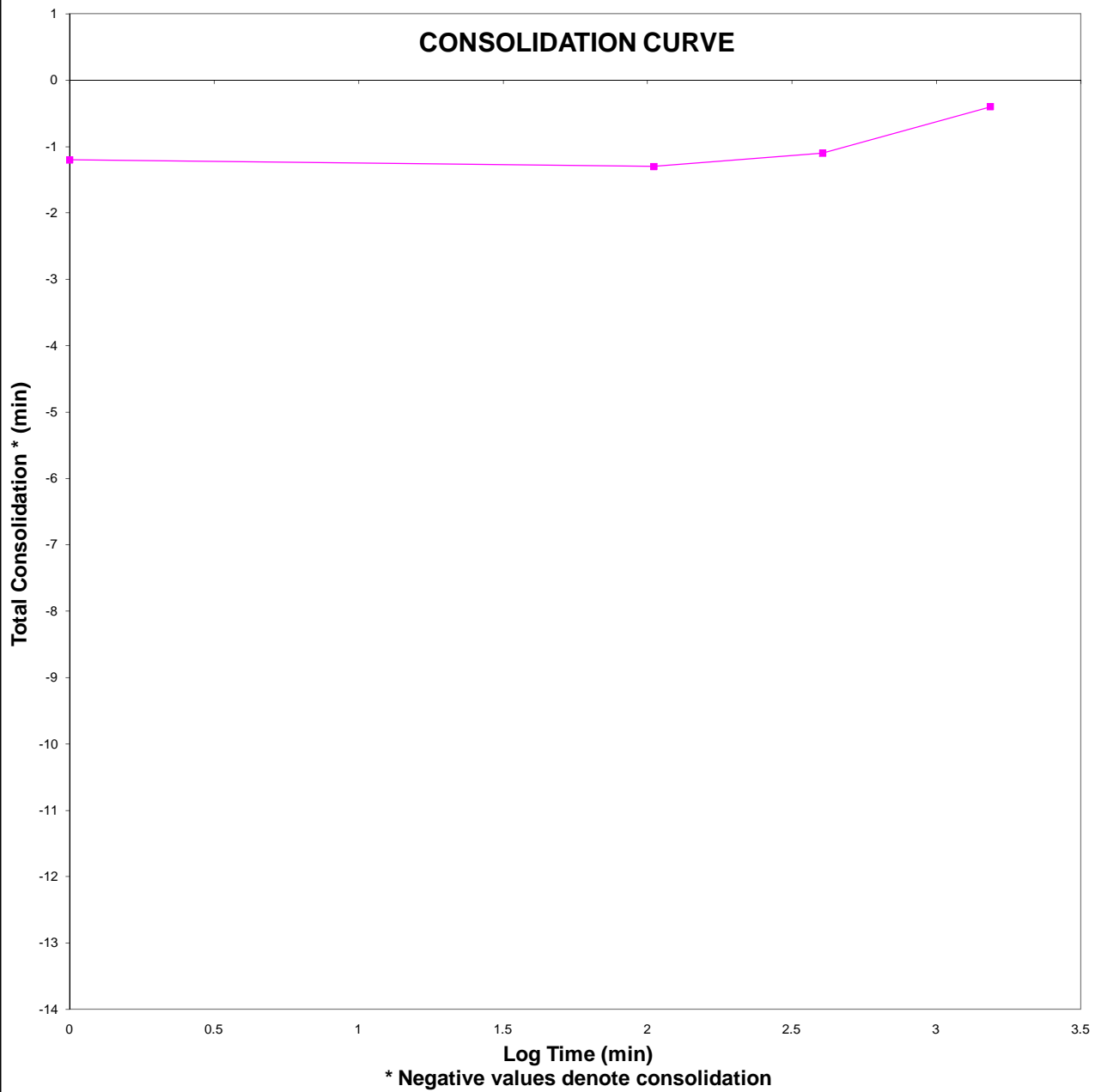
# PERMEABILITY ASTM D5084

## CONSOLIDATION CURVE

Page 4 of 6

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-004  
TEST DATE: 6/9/2009

TESTED BY: SEM  
TRACKING CODE: 5894\_PM  
EQUIPMENT No.: 7



## PERMEABILITY ASTM D5084

## TEST DATA

Page 5 of 6

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-004
TEST DATE:	6/9/2009

TESTED BY:	SEM
TRACKING CODE:	5894_PM
EQUIPMENT No.:	7

[illegible]

**TEST DATA (continued)**

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-004
TEST DATE:	6/9/2009

TESTED BY:	SEM
TRACKING CODE:	5894_PM
EQUIPMENT No.:	7

[illegible]

# PERMEABILITY ASTM D5084

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-004  
TEST DATE: 6/9/2009

TESTED BY: SEM  
TRACKING CODE: 5894\_PM  
EQUIPMENT No.: 7

TESTING PARAMETER	INITIAL	FINAL
BULK UNIT WEIGHT	120.0 lb/ft <sup>3</sup>	122.9 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	96.4 lb/ft <sup>3</sup>	96.5 lb/ft <sup>3</sup>
MOISTURE CONTENT	24.5 %	27.3 %
PERMEABILITY @ 20°C	1.8E-08 cm/sec	



# PERMEABILITY ASTM D5084

## SPECIMEN CONDITIONS

Page 1 of 6

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-005  
TEST DATE: 6/10/2009

TESTED BY: SEM  
TRACKING CODE: 5893\_PM  
EQUIPMENT No.: 4

<b>MOISTURE CONTENT (Dry Basis)</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>1. MOISTURE TIN NO.</b>	0301-005	0301-005
<b>2. WT MOISTURE TIN (tare weight)</b>	0.00 g	381.52 g
<b>3. WT WET SOIL + TARE</b>	565.09 g	957.00 g
<b>4. WT DRY SOIL + TARE</b>	445.18 g	826.70 g
<b>5. WT WATER, W<sub>w</sub></b>	119.91 g	130.30 g
<b>6. WT DRY SOIL, W<sub>s</sub></b>	445.18 g	445.18 g
<b>7. MOISTURE CONTENT, W</b>	26.94 %	29.27 %

<b>SOIL SPECIMEN DIMENSIONS</b>				
<b>TRIPLICATE ANALYSES</b>	<b>DIAMETER</b>		<b>HEIGHT</b>	
	<b>INITIAL</b>	<b>FINAL</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>No. 1</b>	2.97 in.	2.96 in.	2.64 in.	2.60 in.
<b>No. 2</b>	2.97 in.	2.97 in.	2.62 in.	2.62 in.
<b>No. 3</b>	2.97 in.	2.98 in.	2.60 in.	2.64 in.
<b>Average</b>	2.97 in.	2.97 in.	2.62 in.	2.62 in.

<b>SPECIMEN CONDITIONS</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>Specimen WT, W<sub>o</sub></b>	565.09 g	575.74 g
Area, A <sub>o</sub>	6.93 in <sup>2</sup>	6.93 in <sup>2</sup>
Volume, V <sub>o</sub>	18.15 in <sup>3</sup>	18.15 in <sup>3</sup>
Bulk Unit Weight	118.6 lb/ft <sup>3</sup>	120.8 lb/ft <sup>3</sup>
Dry Unit Weight	93.4 lb/ft <sup>3</sup>	93.5 lb/ft <sup>3</sup>

## BACK-PRESSURE SATURATION

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-005
TEST DATE:	6/10/2009

[illegible]

\* Saturation check - no data available.

## SPECIMEN CONSOLIDATION

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-005
TEST DATE:	6/10/2009

SEM  
5893\_PM  
4

[illegible]

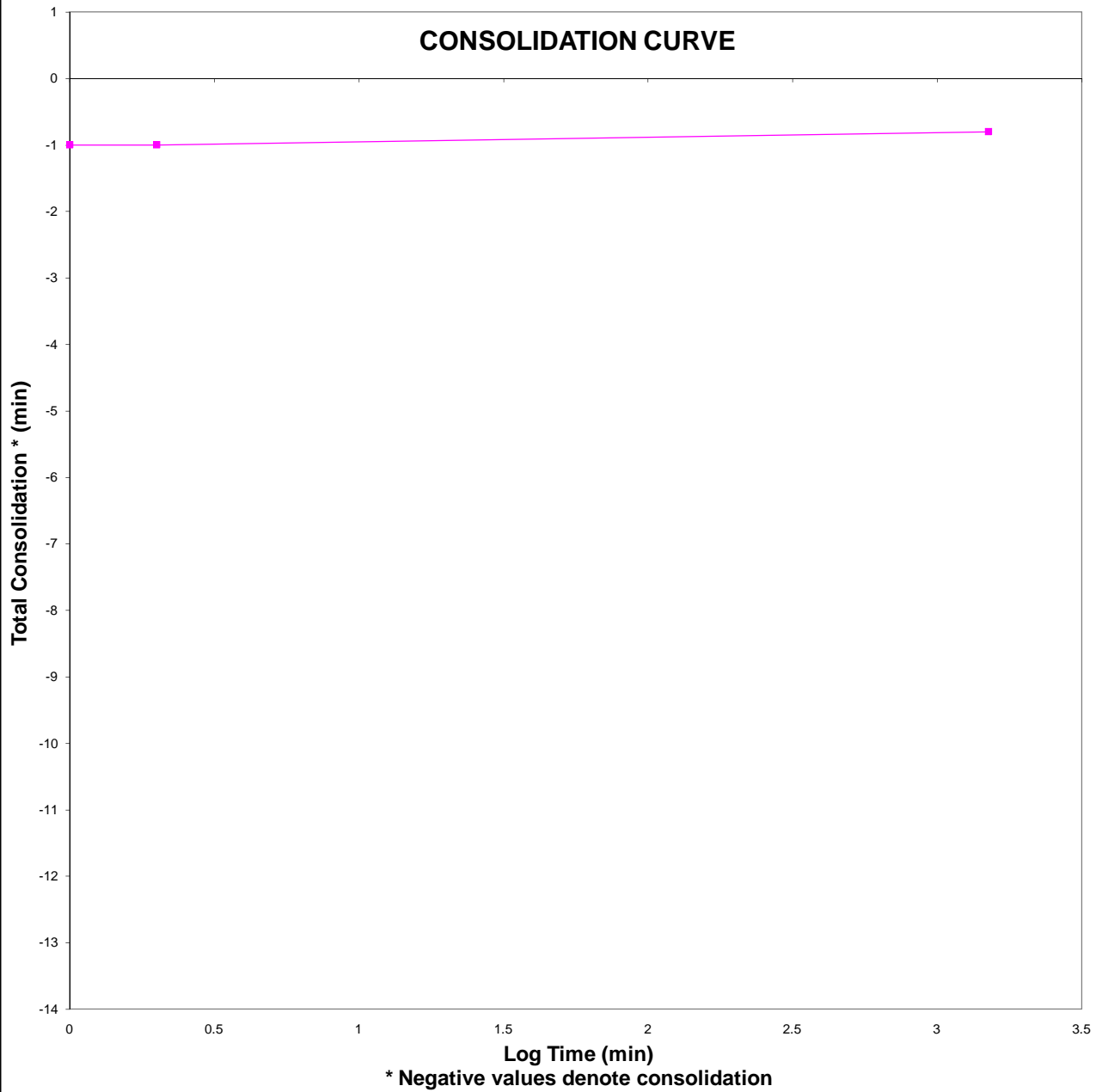
# PERMEABILITY ASTM D5084

## CONSOLIDATION CURVE

Page 4 of 6

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-005  
TEST DATE: 6/10/2009

TESTED BY: SEM  
TRACKING CODE: 5893\_PM  
EQUIPMENT No.: 4



## PERMEABILITY ASTM D5084

## TEST DATA

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PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-005
TEST DATE:	6/10/2009

TESTED BY:	SEM
TRACKING CODE:	5893_PM
EQUIPMENT No.:	4

[illegible]

**TEST DATA (continued)**

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-005
TEST DATE:	6/10/2009

TESTED BY:	SEM
TRACKING CODE:	5893_PM
EQUIPMENT No.:	4

[illegible]

# PERMEABILITY ASTM D5084

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-005  
TEST DATE: 6/10/2009

TESTED BY: SEM  
TRACKING CODE: 5893\_PM  
EQUIPMENT No.: 4

TESTING PARAMETER	INITIAL	FINAL
BULK UNIT WEIGHT	118.6 lb/ft <sup>3</sup>	120.8 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	93.4 lb/ft <sup>3</sup>	93.5 lb/ft <sup>3</sup>
MOISTURE CONTENT	26.9 %	29.3 %
PERMEABILITY @ 20°C	2.2E-08 cm/sec	

# PERMEABILITY ASTM D5084

## SPECIMEN CONDITIONS

Page 1 of 6

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-006  
TEST DATE: 6/10/2009

TESTED BY: SEM  
TRACKING CODE: 5892\_PM  
EQUIPMENT No.: 3

<b>MOISTURE CONTENT (Dry Basis)</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>1. MOISTURE TIN NO.</b>	0301-006	0301-006
<b>2. WT MOISTURE TIN (tare weight)</b>	0.00 <b>g</b>	230.16 <b>g</b>
<b>3. WT WET SOIL + TARE</b>	625.20 <b>g</b>	866.30 <b>g</b>
<b>4. WT DRY SOIL + TARE</b>	496.94 <b>g</b>	727.10 <b>g</b>
5. WT WATER, W <sub>w</sub>	128.26 <b>g</b>	139.20 <b>g</b>
6. WT DRY SOIL, W <sub>s</sub>	496.94 <b>g</b>	496.94 <b>g</b>
7. MOISTURE CONTENT, W	25.81 <b>%</b>	28.01 <b>%</b>

<b>SOIL SPECIMEN DIMENSIONS</b>				
<b>TRIPLICATE ANALYSES</b>	<b>DIAMETER</b>		<b>HEIGHT</b>	
	<b>INITIAL</b>	<b>FINAL</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>No. 1</b>	2.99 in.	2.99 in.	2.85 in.	2.84 in.
<b>No. 2</b>	2.99 in.	2.99 in.	2.84 in.	2.84 in.
<b>No. 3</b>	2.99 in.	2.98 in.	2.84 in.	2.85 in.
Average	2.99 in.	2.99 in.	2.84 in.	2.84 in.

<b>SPECIMEN CONDITIONS</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>Specimen WT, W<sub>o</sub></b>	<b>625.20 g</b>	<b>636.20 g</b>
Area, A <sub>o</sub>	7.02 in <sup>2</sup>	7.01 in <sup>2</sup>
Volume, V <sub>o</sub>	19.96 in <sup>3</sup>	19.92 in <sup>3</sup>
Bulk Unit Weight	119.3 lb/ft <sup>3</sup>	121.7 lb/ft <sup>3</sup>
Dry Unit Weight	94.8 lb/ft <sup>3</sup>	95.0 lb/ft <sup>3</sup>



## BACK-PRESSURE SATURATION

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-006
TEST DATE:	6/10/2009

[illegible]

\* Saturation check - no data available.

## SPECIMEN CONSOLIDATION

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-006
TEST DATE:	6/10/2009

SEM  
5892\_PM  
3

[illegible]

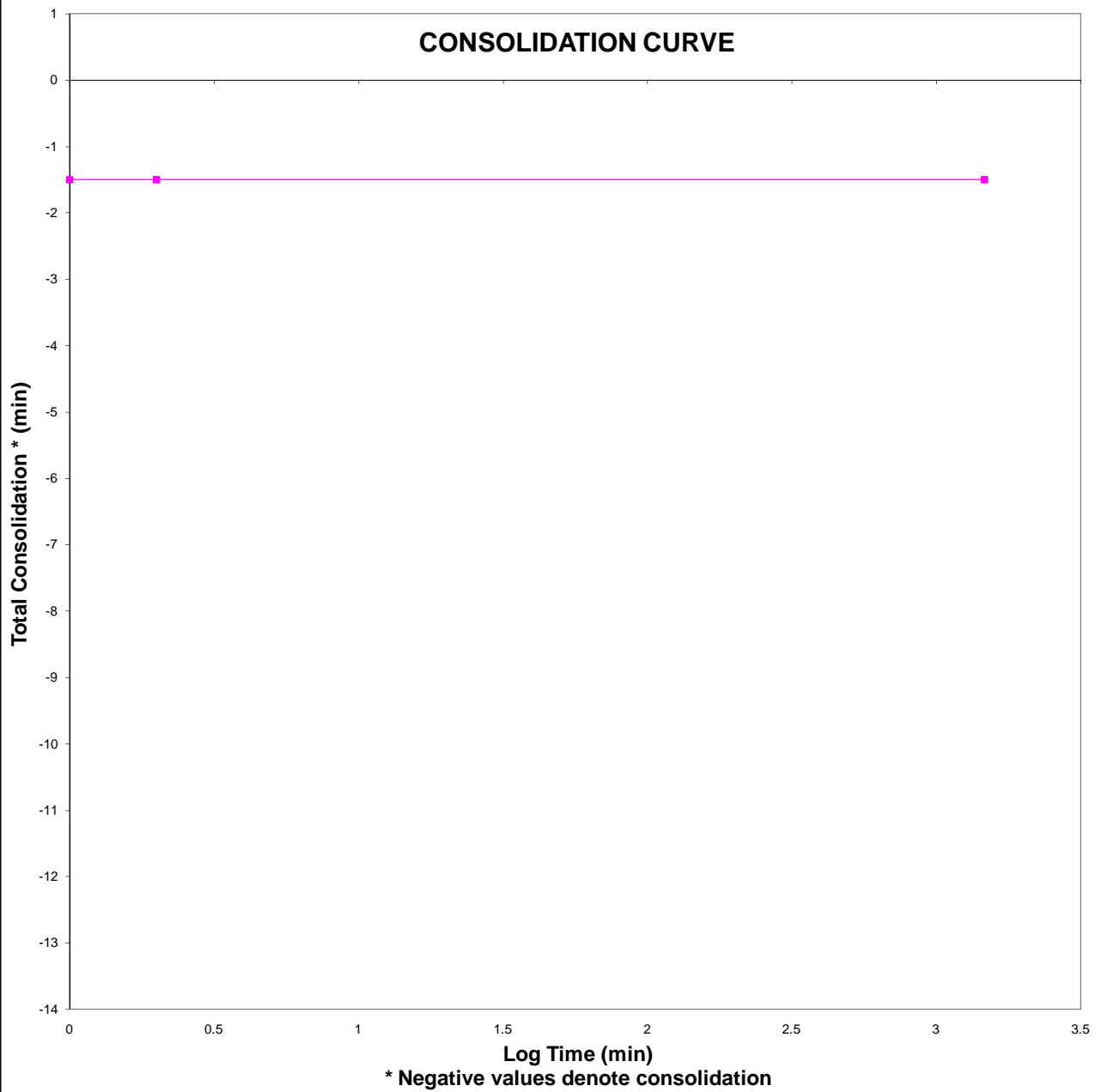
# PERMEABILITY ASTM D5084

## CONSOLIDATION CURVE

Page 4 of 6

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-006  
TEST DATE: 6/10/2009

TESTED BY: SEM  
TRACKING CODE: 5892\_PM  
EQUIPMENT No.: 3



## PERMEABILITY ASTM D5084

## TEST DATA

Page 5 of 6

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-006
TEST DATE:	6/10/2009

TESTED BY:	SEM
TRACKING CODE:	5892_PM
EQUIPMENT No.:	3

[illegible]

**TEST DATA (continued)**

Page 6 of 6

TESTED BY:	SEM
TRACKING CODE:	5892_PM
EQUIPMENT No.:	3

[illegible]

# PERMEABILITY ASTM D5084

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-006  
TEST DATE: 6/10/2009

TESTED BY: SEM  
TRACKING CODE: 5892\_PM  
EQUIPMENT No.: 3

TESTING PARAMETER	INITIAL	FINAL
BULK UNIT WEIGHT	119.3 lb/ft <sup>3</sup>	121.7 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	94.8 lb/ft <sup>3</sup>	95.0 lb/ft <sup>3</sup>
MOISTURE CONTENT	25.8 %	28.0 %
PERMEABILITY @ 20°C	2.9E-08 cm/sec	

# PERMEABILITY ASTM D5084

## SPECIMEN CONDITIONS

Page 1 of 6

PROJECT: Norwich MGP  
 PROJECT No.: SE-0301  
 SAMPLE No.: 0301-007  
 TEST DATE: 6/23/2009

TESTED BY: SEM  
 TRACKING CODE: 5905\_PM  
 EQUIPMENT No.: 2

<b>MOISTURE CONTENT (Dry Basis)</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>1. MOISTURE TIN NO.</b>	0301-007	0301-007
<b>2. WT MOISTURE TIN (tare weight)</b>	0.00 <b>g</b>	223.89 <b>g</b>
<b>3. WT WET SOIL + TARE</b>	473.19 <b>g</b>	704.50 <b>g</b>
<b>4. WT DRY SOIL + TARE</b>	354.98 <b>g</b>	578.87 <b>g</b>
5. WT WATER, W <sub>w</sub>	118.21 <b>g</b>	125.63 <b>g</b>
6. WT DRY SOIL, W <sub>s</sub>	354.98 <b>g</b>	354.98 <b>g</b>
7. MOISTURE CONTENT, W	33.30 <b>%</b>	35.39 <b>%</b>

<b>SOIL SPECIMEN DIMENSIONS</b>				
<b>TRIPLICATE</b>	<b>DIAMETER</b>		<b>HEIGHT</b>	
<b>ANALYSES</b>	<b>INITIAL</b>	<b>FINAL</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>No. 1</b>	2.97 in.	2.97 in.	2.21 in.	2.22 in.
<b>No. 2</b>	2.97 in.	2.98 in.	2.22 in.	2.22 in.
<b>No. 3</b>	2.98 in.	2.98 in.	2.22 in.	2.22 in.
Average	2.97 in.	2.98 in.	2.22 in.	2.22 in.

<b>SPECIMEN CONDITIONS</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>Specimen WT, W<sub>o</sub></b>	<b>473.19 g</b>	<b>480.75 g</b>
Area, A <sub>o</sub>	6.94 in <sup>2</sup>	6.96 in <sup>2</sup>
Volume, V <sub>o</sub>	15.39 in <sup>3</sup>	15.45 in <sup>3</sup>
Bulk Unit Weight	117.1 lb/ft <sup>3</sup>	118.5 lb/ft <sup>3</sup>
Dry Unit Weight	87.9 lb/ft <sup>3</sup>	87.6 lb/ft <sup>3</sup>

## BACK-PRESSURE SATURATION

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-007
TEST DATE:	6/23/2009

TESTED BY:	SEM
TRACKING CODE:	5905_PM
EQUIPMENT No.:	2

[illegible]

\* Saturation check - no data available.



## SPECIMEN CONSOLIDATION

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-007
TEST DATE:	6/23/2009

$$\frac{\text{SEM}}{5905\_PM}$$
[illegible]

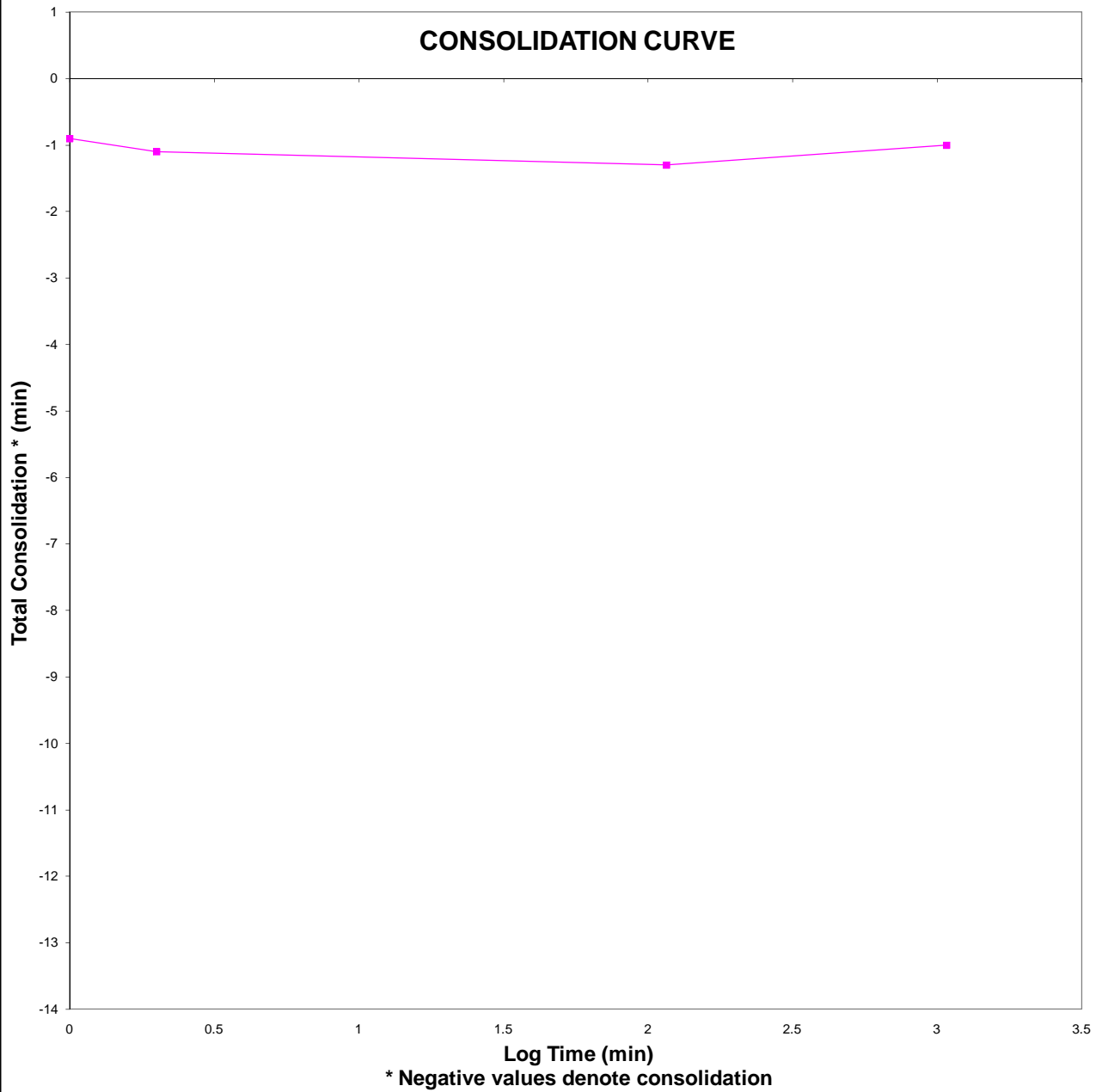
# PERMEABILITY ASTM D5084

## CONSOLIDATION CURVE

Page 4 of 6

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-007  
TEST DATE: 6/23/2009

TESTED BY: SEM  
TRACKING CODE: 5905\_PM  
EQUIPMENT No.: 2



## PERMEABILITY ASTM D5084

## TEST DATA

Page 5 of 6

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-007
TEST DATE:	6/23/2009

TESTED BY:	SEM
TRACKING CODE:	5905_PM
EQUIPMENT No.:	2

[illegible]

**TEST DATA (continued)**

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TESTED BY:	SEM
TRACKING CODE:	5905_PM
EQUIPMENT No.:	2

[illegible]

# PERMEABILITY ASTM D5084

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-007  
TEST DATE: 6/23/2009

TESTED BY: SEM  
TRACKING CODE: 5905\_PM  
EQUIPMENT No.: 2

TESTING PARAMETER	INITIAL	FINAL
BULK UNIT WEIGHT	117.1 lb/ft <sup>3</sup>	118.5 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	87.9 lb/ft <sup>3</sup>	87.6 lb/ft <sup>3</sup>
MOISTURE CONTENT	33.3 %	35.4 %
PERMEABILITY @ 20°C	5.8E-08 cm/sec	

# PERMEABILITY ASTM D5084

## SPECIMEN CONDITIONS

Page 1 of 6

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-008  
TEST DATE: 6/23/2009

TESTED BY: SEM  
TRACKING CODE: 5906\_PM  
EQUIPMENT No.: 7

<b>MOISTURE CONTENT (Dry Basis)</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>1. MOISTURE TIN NO.</b>	0301-008	0301-008
<b>2. WT MOISTURE TIN (tare weight)</b>	0.00 g	207.10 g
<b>3. WT WET SOIL + TARE</b>	490.19 g	707.50 g
<b>4. WT DRY SOIL + TARE</b>	357.11 g	564.21 g
5. WT WATER, W <sub>w</sub>	133.08 g	143.29 g
6. WT DRY SOIL, W <sub>s</sub>	357.11 g	357.11 g
7. MOISTURE CONTENT, W	37.27 %	40.12 %

<b>SOIL SPECIMEN DIMENSIONS</b>				
<b>TRIPLICATE ANALYSES</b>	<b>DIAMETER</b>		<b>HEIGHT</b>	
	<b>INITIAL</b>	<b>FINAL</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>No. 1</b>	2.97 in.	2.97 in.	2.36 in.	2.36 in.
<b>No. 2</b>	2.98 in.	2.98 in.	2.36 in.	2.36 in.
<b>No. 3</b>	2.98 in.	2.98 in.	2.37 in.	2.36 in.
Average	2.98 in.	2.98 in.	2.36 in.	2.36 in.

<b>SPECIMEN CONDITIONS</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>Specimen WT, W<sub>o</sub></b>	<b>490.19 g</b>	<b>500.53 g</b>
Area, A <sub>o</sub>	6.96 in <sup>2</sup>	6.96 in <sup>2</sup>
Volume, V <sub>o</sub>	16.45 in <sup>3</sup>	16.42 in <sup>3</sup>
Bulk Unit Weight	113.5 lb/ft <sup>3</sup>	116.1 lb/ft <sup>3</sup>
Dry Unit Weight	82.7 lb/ft <sup>3</sup>	82.9 lb/ft <sup>3</sup>

## BACK-PRESSURE SATURATION

TESTED BY:	SEM
TRACKING CODE:	5906_PM
EQUIPMENT No.:	7

\* Saturation check - no data available.

## SPECIMEN CONSOLIDATION

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-008
TEST DATE:	6/23/2009

SEM  
5906\_PM  
7

[illegible]



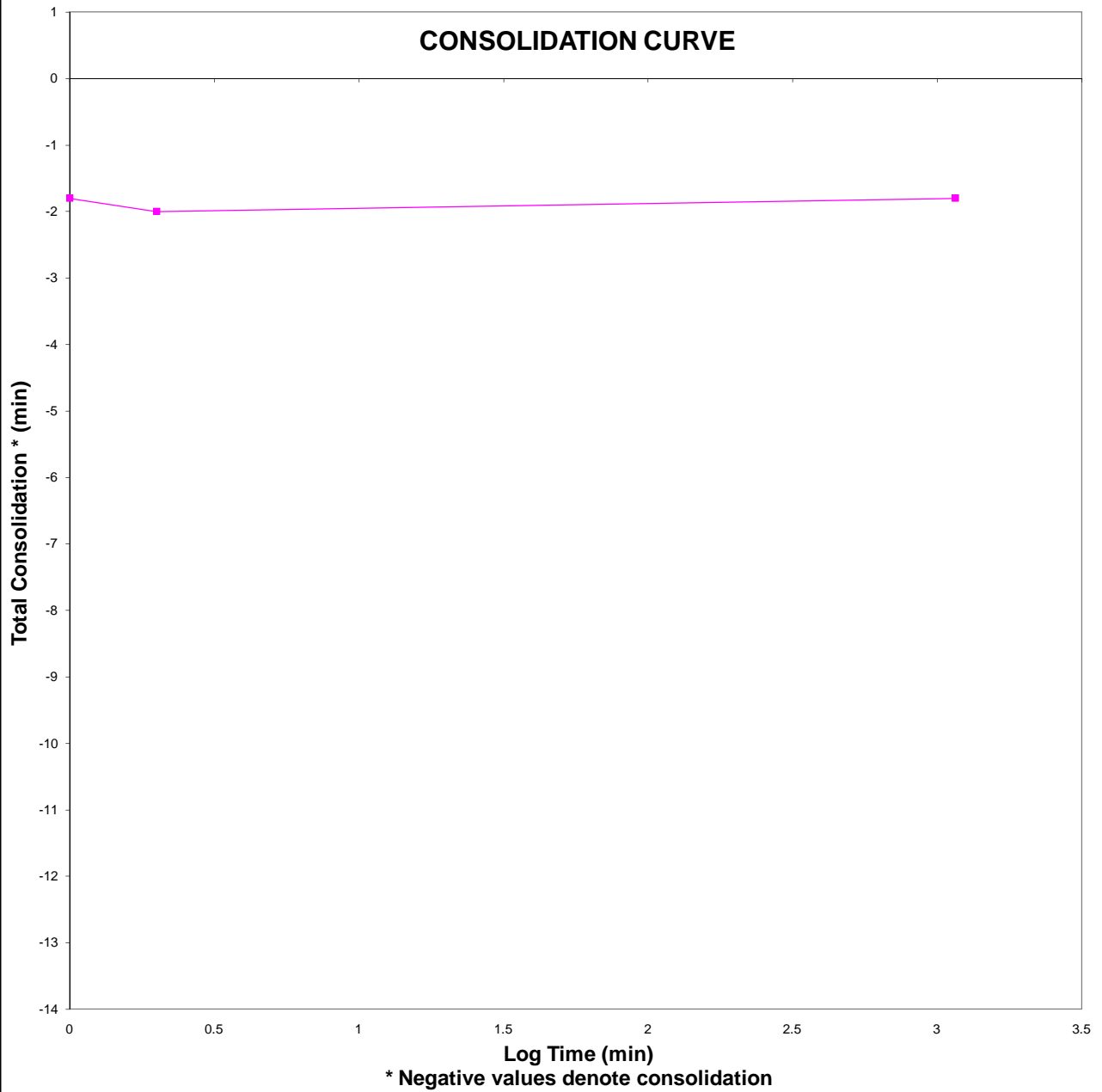
# PERMEABILITY ASTM D5084

## CONSOLIDATION CURVE

Page 4 of 6

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-008  
TEST DATE: 6/23/2009

TESTED BY: SEM  
TRACKING CODE: 5906\_PM  
EQUIPMENT No.: 7



## PERMEABILITY ASTM D5084

## TEST DATA

Page 5 of 6

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-008
TEST DATE:	6/23/2009

TESTED BY:	SEM
TRACKING CODE:	5906_PM
EQUIPMENT No.:	7

[illegible]

## PERMEABILITY ASTM D5084

### TEST DATA (continued)

Page 6 of 6

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-008
TEST DATE:	6/23/2009

TESTED BY:	SEM
TRACKING CODE:	5906_PM
EQUIPMENT No.:	7

[illegible]

# PERMEABILITY ASTM D5084

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-008  
TEST DATE: 6/23/2009

TESTED BY: SEM  
TRACKING CODE: 5906\_PM  
EQUIPMENT No.: 7

TESTING PARAMETER	INITIAL	FINAL
BULK UNIT WEIGHT	113.5 lb/ft <sup>3</sup>	116.1 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	82.7 lb/ft <sup>3</sup>	82.9 lb/ft <sup>3</sup>
MOISTURE CONTENT	37.3 %	40.1 %
PERMEABILITY @ 20°C	9.4E-08 cm/sec	

# PERMEABILITY ASTM D5084

## SPECIMEN CONDITIONS

Page 1 of 6

PROJECT: Norwich MGP  
 PROJECT No.: SE-0301  
 SAMPLE No.: 0301-009  
 TEST DATE: 6/30/2009

TESTED BY: SEM  
 TRACKING CODE: 5907\_PM  
 EQUIPMENT No.: 2

<b>MOISTURE CONTENT (Dry Basis)</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>1. MOISTURE TIN NO.</b>	0301-009	0301-009
<b>2. WT MOISTURE TIN (tare weight)</b>	0.00 <b>g</b>	503.94 <b>g</b>
<b>3. WT WET SOIL + TARE</b>	505.21 <b>g</b>	1017.20 <b>g</b>
<b>4. WT DRY SOIL + TARE</b>	389.76 <b>g</b>	893.70 <b>g</b>
5. WT WATER, W <sub>w</sub>	115.45 <b>g</b>	123.50 <b>g</b>
6. WT DRY SOIL, W <sub>s</sub>	389.76 <b>g</b>	389.76 <b>g</b>
7. MOISTURE CONTENT, W	29.62 <b>%</b>	31.69 <b>%</b>

<b>SOIL SPECIMEN DIMENSIONS</b>				
<b>TRIPLICATE</b>	<b>DIAMETER</b>		<b>HEIGHT</b>	
<b>ANALYSES</b>	<b>INITIAL</b>	<b>FINAL</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>No. 1</b>	2.98 in.	2.98 in.	2.43 in.	2.42 in.
<b>No. 2</b>	2.98 in.	2.98 in.	2.43 in.	2.43 in.
<b>No. 3</b>	2.99 in.	in.	2.43 in.	2.42 in.
Average	2.98 in.	2.98 in.	2.43 in.	2.42 in.

<b>SPECIMEN CONDITIONS</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>Specimen WT, W<sub>o</sub></b>	505.21 <b>g</b>	514.30 <b>g</b>
Area, A <sub>o</sub>	6.99 in <sup>2</sup>	6.97 in <sup>2</sup>
Volume, V <sub>o</sub>	16.99 in <sup>3</sup>	16.90 in <sup>3</sup>
Bulk Unit Weight	113.3 lb/ft <sup>3</sup>	115.9 lb/ft <sup>3</sup>
Dry Unit Weight	87.4 lb/ft <sup>3</sup>	88.0 lb/ft <sup>3</sup>

## BACK-PRESSURE SATURATION

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-009
TEST DATE:	6/30/2009

[illegible]

\* Saturation check - no data available.

## SPECIMEN CONSOLIDATION

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-009
TEST DATE:	6/30/2009

$$\frac{\text{SEM}}{5907\_PM}$$
[illegible]

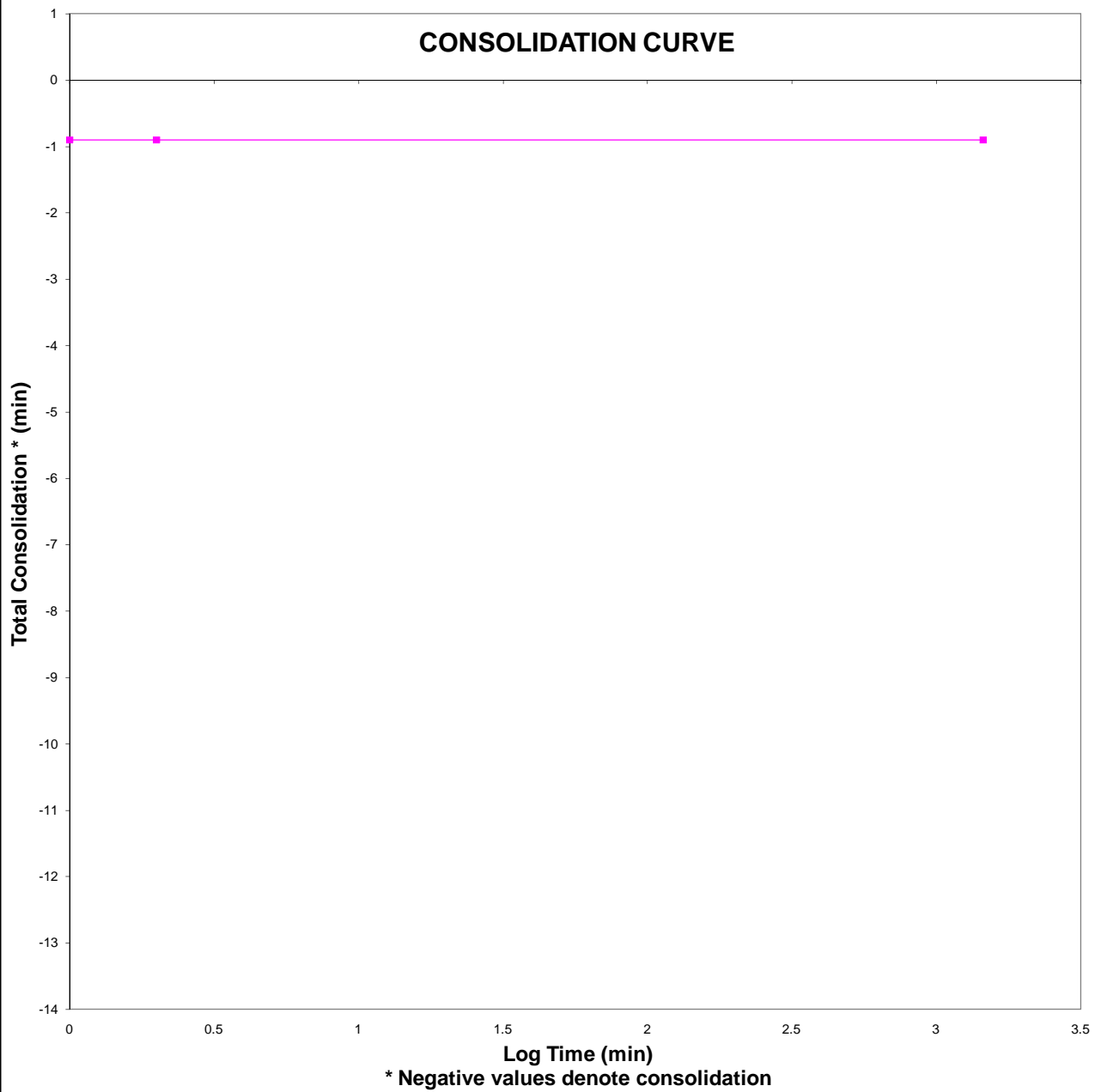
# PERMEABILITY ASTM D5084

## CONSOLIDATION CURVE

Page 4 of 6

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-009  
TEST DATE: 6/30/2009

TESTED BY: SEM  
TRACKING CODE: 5907\_PM  
EQUIPMENT No.: 2





## PERMEABILITY ASTM D5084

## TEST DATA

Page 5 of 6

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-009
TEST DATE:	6/30/2009

TESTED BY:	SEM
TRACKING CODE:	5907_PM
EQUIPMENT No.:	2

[illegible]

## PERMEABILITY ASTM D5084

### TEST DATA (continued)

Page 6 of 6

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-009
TEST DATE:	6/30/2009

TESTED BY:	SEM
TRACKING CODE:	5907_PM
EQUIPMENT No.:	2

[illegible]

# PERMEABILITY ASTM D5084

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-009  
TEST DATE: 6/30/2009

TESTED BY: SEM  
TRACKING CODE: 5907\_PM  
EQUIPMENT No.: 2

TESTING PARAMETER	INITIAL	FINAL
BULK UNIT WEIGHT	113.3 lb/ft <sup>3</sup>	115.9 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	87.4 lb/ft <sup>3</sup>	88.0 lb/ft <sup>3</sup>
MOISTURE CONTENT	29.6 %	31.7 %
PERMEABILITY @ 20°C	7.5E-08 cm/sec	

# PERMEABILITY ASTM D5084

## SPECIMEN CONDITIONS

Page 1 of 6

PROJECT: Norwich MGP  
 PROJECT No.: SE-0301  
 SAMPLE No.: 0301-010  
 TEST DATE: 6/30/2009

TESTED BY: SEM  
 TRACKING CODE: 5911\_PM  
 EQUIPMENT No.: 3

<b>MOISTURE CONTENT (Dry Basis)</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>1. MOISTURE TIN NO.</b>	0301-010	0301-010
<b>2. WT MOISTURE TIN (tare weight)</b>	0.00 g	256.79 g
<b>3. WT WET SOIL + TARE</b>	476.77 g	740.40 g
<b>4. WT DRY SOIL + TARE</b>	356.81 g	613.60 g
5. WT WATER, W <sub>w</sub>	119.96 g	126.80 g
6. WT DRY SOIL, W <sub>s</sub>	356.81 g	356.81 g
7. MOISTURE CONTENT, W	33.62 %	35.54 %

<b>SOIL SPECIMEN DIMENSIONS</b>				
<b>TRIPLICATE</b>	<b>DIAMETER</b>		<b>HEIGHT</b>	
<b>ANALYSES</b>	<b>INITIAL</b>	<b>FINAL</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>No. 1</b>	2.98 in.	2.99 in.	2.28 in.	2.29 in.
<b>No. 2</b>	2.99 in.	2.98 in.	2.29 in.	2.29 in.
<b>No. 3</b>	3.00 in.	3.00 in.	2.29 in.	2.29 in.
Average	2.99 in.	2.99 in.	2.29 in.	2.29 in.

<b>SPECIMEN CONDITIONS</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>Specimen WT, W<sub>o</sub></b>	<b>476.77 g</b>	<b>483.63 g</b>
Area, A <sub>o</sub>	7.02 in <sup>2</sup>	7.02 in <sup>2</sup>
Volume, V <sub>o</sub>	16.06 in <sup>3</sup>	16.08 in <sup>3</sup>
Bulk Unit Weight	113.1 lb/ft <sup>3</sup>	114.6 lb/ft <sup>3</sup>
Dry Unit Weight	84.7 lb/ft <sup>3</sup>	84.5 lb/ft <sup>3</sup>

## BACK-PRESSURE SATURATION

TESTED BY:	SEM
TRACKING CODE:	5911_PM
EQUIPMENT No.:	3

\* Saturation check - no data available.

## SPECIMEN CONSOLIDATION

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-010
TEST DATE:	6/30/2009

SEM  
5911\_PM  
3

[illegible]

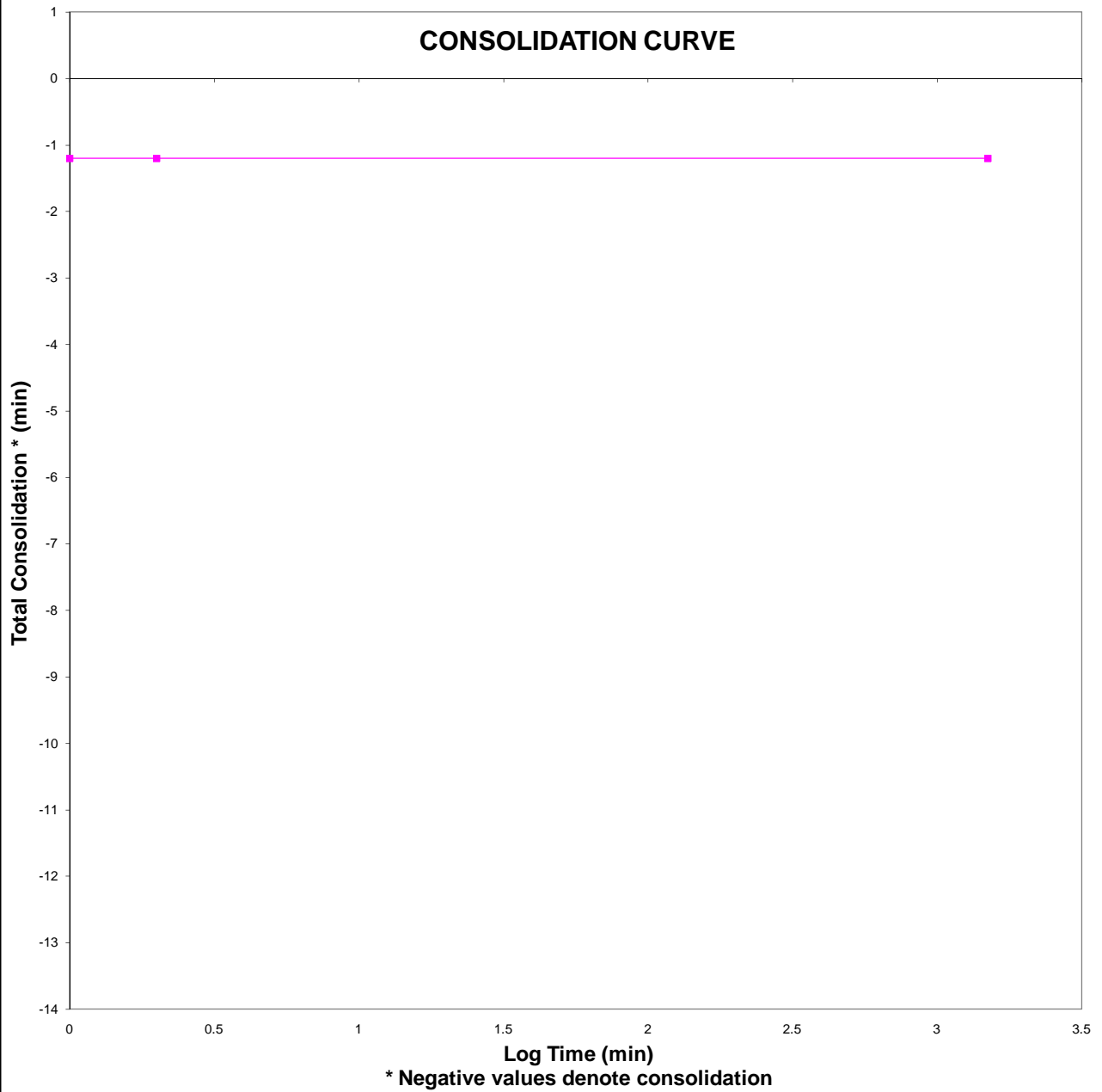
# PERMEABILITY ASTM D5084

## CONSOLIDATION CURVE

Page 4 of 6

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-010  
TEST DATE: 6/30/2009

TESTED BY: SEM  
TRACKING CODE: 5911\_PM  
EQUIPMENT No.: 3



## PERMEABILITY ASTM D5084

## TEST DATA

Page 5 of 6

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-010
TEST DATE:	6/30/2009

TESTED BY:	SEM
TRACKING CODE:	5911_PM
EQUIPMENT No.:	3

[illegible]



## PERMEABILITY ASTM D5084

### TEST DATA (continued)

Page 6 of 6

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-010
TEST DATE:	6/30/2009

TESTED BY:	SEM
TRACKING CODE:	5911_PM
EQUIPMENT No.:	3

[illegible]

# PERMEABILITY ASTM D5084

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-010  
TEST DATE: 6/30/2009

TESTED BY: SEM  
TRACKING CODE: 5911\_PM  
EQUIPMENT No.: 3

TESTING PARAMETER	INITIAL	FINAL
BULK UNIT WEIGHT	113.1 lb/ft <sup>3</sup>	114.6 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	84.7 lb/ft <sup>3</sup>	84.5 lb/ft <sup>3</sup>
MOISTURE CONTENT	33.6 %	35.5 %
PERMEABILITY @ 20°C	8.7E-08 cm/sec	

# PERMEABILITY ASTM D5084

## SPECIMEN CONDITIONS

Page 1 of 6

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-011  
TEST DATE: 6/2/2009

TESTED BY: SEM  
TRACKING CODE: 5881\_PM  
EQUIPMENT No.: 1

<b>MOISTURE CONTENT (Dry Basis)</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>1. MOISTURE TIN NO.</b>	0301-011	0301-011
<b>2. WT MOISTURE TIN (tare weight)</b>	0.00 g	207.18 g
<b>3. WT WET SOIL + TARE</b>	647.10 g	858.70 g
<b>4. WT DRY SOIL + TARE</b>	584.22 g	791.40 g
5. WT WATER, W <sub>w</sub>	62.88 g	67.30 g
6. WT DRY SOIL, W <sub>s</sub>	584.22 g	584.22 g
7. MOISTURE CONTENT, W	10.76 %	11.52 %

<b>SOIL SPECIMEN DIMENSIONS</b>				
<b>TRIPLICATE ANALYSES</b>	<b>DIAMETER</b>		<b>HEIGHT</b>	
	<b>INITIAL</b>	<b>FINAL</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>No. 1</b>	2.95 in.	2.96 in.	2.64 in.	2.64 in.
<b>No. 2</b>	2.96 in.	2.95 in.	2.68 in.	2.66 in.
<b>No. 3</b>	2.97 in.	2.97 in.	2.66 in.	2.68 in.
Average	2.96 in.	2.96 in.	2.66 in.	2.66 in.

<b>SPECIMEN CONDITIONS</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>Specimen WT, W<sub>o</sub></b>	<b>647.10 g</b>	<b>251.70 g</b>
Area, A <sub>o</sub>	6.88 in <sup>2</sup>	6.88 in <sup>2</sup>
Volume, V <sub>o</sub>	18.30 in <sup>3</sup>	18.30 in <sup>3</sup>
Bulk Unit Weight	134.7 lb/ft <sup>3</sup>	52.4 lb/ft <sup>3</sup>
Dry Unit Weight	121.6 lb/ft <sup>3</sup>	47.0 lb/ft <sup>3</sup>

## BACK-PRESSURE SATURATION

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-011
TEST DATE:	6/2/2009

[illegible]

\* Saturation check - no data available.

## SPECIMEN CONSOLIDATION

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-011
TEST DATE:	6/2/2009

SEM  
5881\_PM  
1

[illegible]

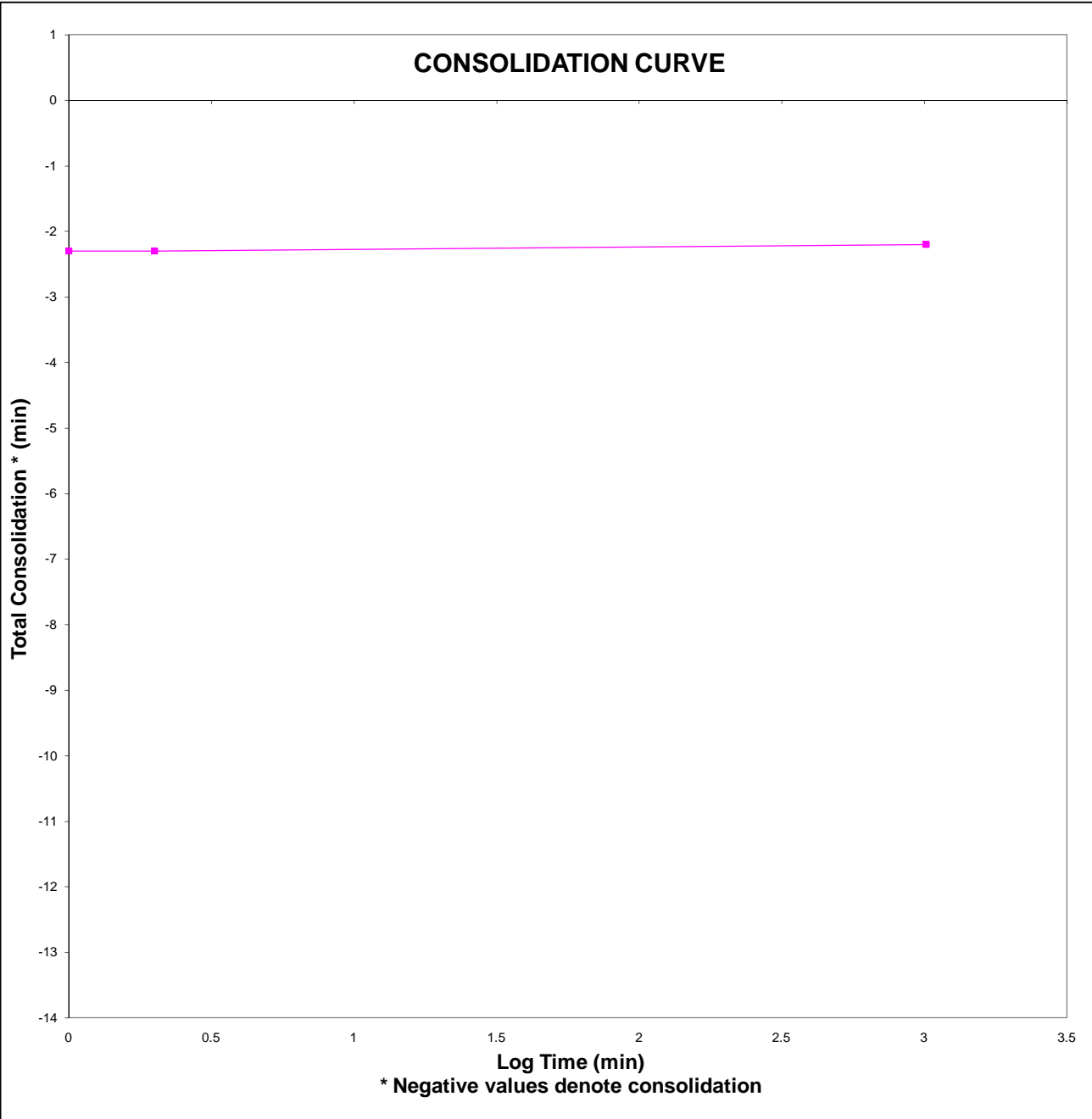
# PERMEABILITY ASTM D5084

## CONSOLIDATION CURVE

Page 4 of 6

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-011  
TEST DATE: 6/2/2009

TESTED BY: SEM  
TRACKING CODE: 5881\_PM  
EQUIPMENT No.: 1



## PERMEABILITY ASTM D5084

## TEST DATA

Page 5 of 6

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-011
TEST DATE:	6/2/2009

TESTED BY:	SEM
TRACKING CODE:	5881_PM
EQUIPMENT No.:	1

[illegible]

**TEST DATA (continued)**

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-011
TEST DATE:	6/2/2009

TESTED BY:	SEM
TRACKING CODE:	5881_PM
EQUIPMENT No.:	1

[illegible]



# PERMEABILITY ASTM D5084

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-011  
TEST DATE: 6/2/2009

TESTED BY: SEM  
TRACKING CODE: 5881\_PM  
EQUIPMENT No.: 1

TESTING PARAMETER	INITIAL	FINAL
BULK UNIT WEIGHT	134.7 lb/ft <sup>3</sup>	52.4 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	121.6 lb/ft <sup>3</sup>	47.0 lb/ft <sup>3</sup>
MOISTURE CONTENT	10.8 %	11.5 %
PERMEABILITY @ 20°C	1.7E-07 cm/sec	

# PERMEABILITY ASTM D5084

## SPECIMEN CONDITIONS

Page 1 of 6

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-011 (Re-run)  
TEST DATE: 9/16/2009

TESTED BY: SEM  
TRACKING CODE: 6242\_PM  
EQUIPMENT No.: 3

<b>MOISTURE CONTENT (Dry Basis)</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>1. MOISTURE TIN NO.</b>	0301-011 (rerun)	0301-011 (rerun)
<b>2. WT MOISTURE TIN (tare weight)</b>	0.00 <b>g</b>	167.31 <b>g</b>
<b>3. WT WET SOIL + TARE</b>	225.71 <b>g</b>	398.72 <b>g</b>
<b>4. WT DRY SOIL + TARE</b>	205.72 <b>g</b>	373.03 <b>g</b>
5. WT WATER, W <sub>w</sub>	19.99 <b>g</b>	25.69 <b>g</b>
6. WT DRY SOIL, W <sub>s</sub>	205.72 <b>g</b>	205.72 <b>g</b>
7. MOISTURE CONTENT, W	9.72 <b>%</b>	12.49 <b>%</b>

<b>SOIL SPECIMEN DIMENSIONS</b>				
<b>TRIPLICATE ANALYSES</b>	<b>DIAMETER</b>		<b>HEIGHT</b>	
	<b>INITIAL</b>	<b>FINAL</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>No. 1</b>	2.00 in.	2.00 in.	2.02 in.	2.02 in.
<b>No. 2</b>	2.00 in.	2.00 in.	2.02 in.	2.02 in.
<b>No. 3</b>	2.01 in.	2.00 in.	2.03 in.	2.02 in.
Average	2.00 in.	2.00 in.	2.02 in.	2.02 in.

<b>SPECIMEN CONDITIONS</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>Specimen WT, W<sub>o</sub></b>	<b>225.71 g</b>	<b>231.52 g</b>
Area, A <sub>o</sub>	3.15 in <sup>2</sup>	3.14 in <sup>2</sup>
Volume, V <sub>o</sub>	6.38 in <sup>3</sup>	6.35 in <sup>3</sup>
Bulk Unit Weight	134.8 lb/ft <sup>3</sup>	139.0 lb/ft <sup>3</sup>
Dry Unit Weight	122.9 lb/ft <sup>3</sup>	123.6 lb/ft <sup>3</sup>

## BACK-PRESSURE SATURATION

TESTED BY:	SEM
TRACKING CODE:	6242_PM
EQUIPMENT No.:	3

\* Saturation check - no data available.

## SPECIMEN CONSOLIDATION

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-011 (Re-run)
TEST DATE:	9/16/2009

SEM  
6242\_PM  
3

[illegible]

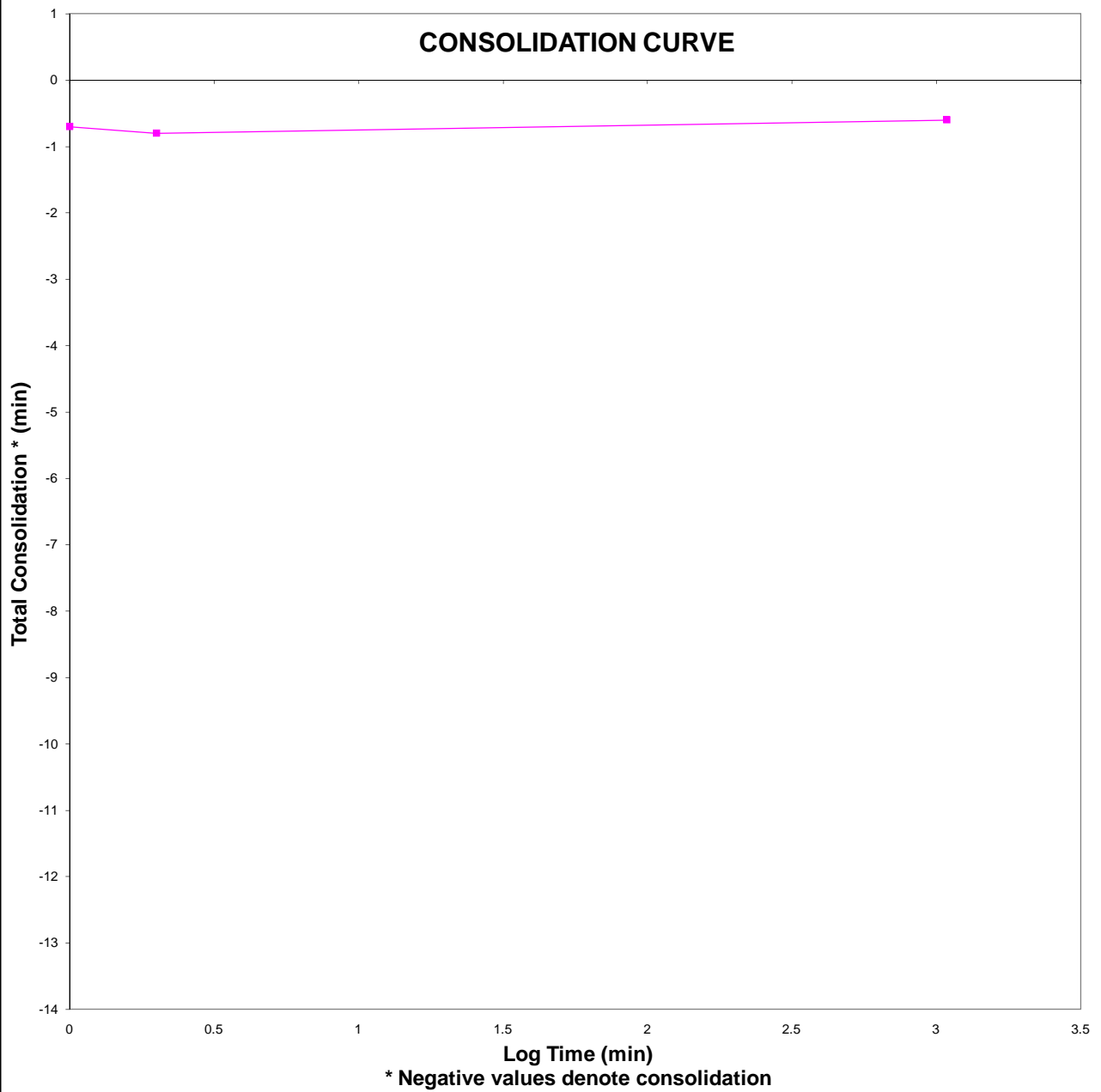
# PERMEABILITY ASTM D5084

## CONSOLIDATION CURVE

Page 4 of 6

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-011 (Re-run)  
TEST DATE: 9/16/2009

TESTED BY: SEM  
TRACKING CODE: 6242\_PM  
EQUIPMENT No.: 3



## PERMEABILITY ASTM D5084

## TEST DATA

Page 5 of 6

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-011 (Re-run)
TEST DATE:	9/16/2009

TESTED BY:	SEM
TRACKING CODE:	6242_PM
EQUIPMENT No.:	3

[illegible]

**TEST DATA (continued)**

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-011 (Re-run)
TEST DATE:	9/16/2009

TESTED BY:	SEM
TRACKING CODE:	6242_PM
EQUIPMENT No.:	3

[illegible]

# PERMEABILITY ASTM D5084

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-011 (Re-run)  
TEST DATE: 9/16/2009

TESTED BY: SEM  
TRACKING CODE: 6242\_PM  
EQUIPMENT No.: 3

TESTING PARAMETER	INITIAL	FINAL
BULK UNIT WEIGHT	134.8 lb/ft <sup>3</sup>	139.0 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	122.9 lb/ft <sup>3</sup>	123.6 lb/ft <sup>3</sup>
MOISTURE CONTENT	9.7 %	12.5 %
PERMEABILITY @ 20°C	5.8E-07 cm/sec	



# PERMEABILITY ASTM D5084

## SPECIMEN CONDITIONS

Page 1 of 6

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-012  
TEST DATE: 6/3/2009

TESTED BY: SEM  
TRACKING CODE: 5882\_PM  
EQUIPMENT No.: 3

<b>MOISTURE CONTENT (Dry Basis)</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>1. MOISTURE TIN NO.</b>	0301-012	0301-012
<b>2. WT MOISTURE TIN (tare weight)</b>	0.00 <b>g</b>	204.92 <b>g</b>
<b>3. WT WET SOIL + TARE</b>	486.45 <b>g</b>	699.70 <b>g</b>
<b>4. WT DRY SOIL + TARE</b>	433.08 <b>g</b>	638.00 <b>g</b>
5. WT WATER, W <sub>w</sub>	53.37 <b>g</b>	61.70 <b>g</b>
6. WT DRY SOIL, W <sub>s</sub>	433.08 <b>g</b>	433.08 <b>g</b>
7. MOISTURE CONTENT, W	12.32 <b>%</b>	14.25 <b>%</b>

<b>SOIL SPECIMEN DIMENSIONS</b>				
<b>TRIPLICATE ANALYSES</b>	<b>DIAMETER</b>		<b>HEIGHT</b>	
	<b>INITIAL</b>	<b>FINAL</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>No. 1</b>	2.99 in.	2.99 in.	2.01 in.	2.01 in.
<b>No. 2</b>	3.00 in.	3.00 in.	2.01 in.	2.02 in.
<b>No. 3</b>	3.07 in.	3.00 in.	2.02 in.	2.02 in.
Average	3.02 in.	3.00 in.	2.01 in.	2.02 in.

<b>SPECIMEN CONDITIONS</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>Specimen WT, W<sub>o</sub></b>	<b>486.45 g</b>	<b>494.98 g</b>
Area, A <sub>o</sub>	7.16 in <sup>2</sup>	7.05 in <sup>2</sup>
Volume, V <sub>o</sub>	14.42 in <sup>3</sup>	14.22 in <sup>3</sup>
Bulk Unit Weight	128.5 lb/ft <sup>3</sup>	132.6 lb/ft <sup>3</sup>
Dry Unit Weight	114.4 lb/ft <sup>3</sup>	116.0 lb/ft <sup>3</sup>

## BACK-PRESSURE SATURATION

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-012
TEST DATE:	6/3/2009

[illegible]

\* Saturation check - no data available.

## SPECIMEN CONSOLIDATION

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-012
TEST DATE:	6/3/2009

SEM  
5882\_PM  
3

[illegible]

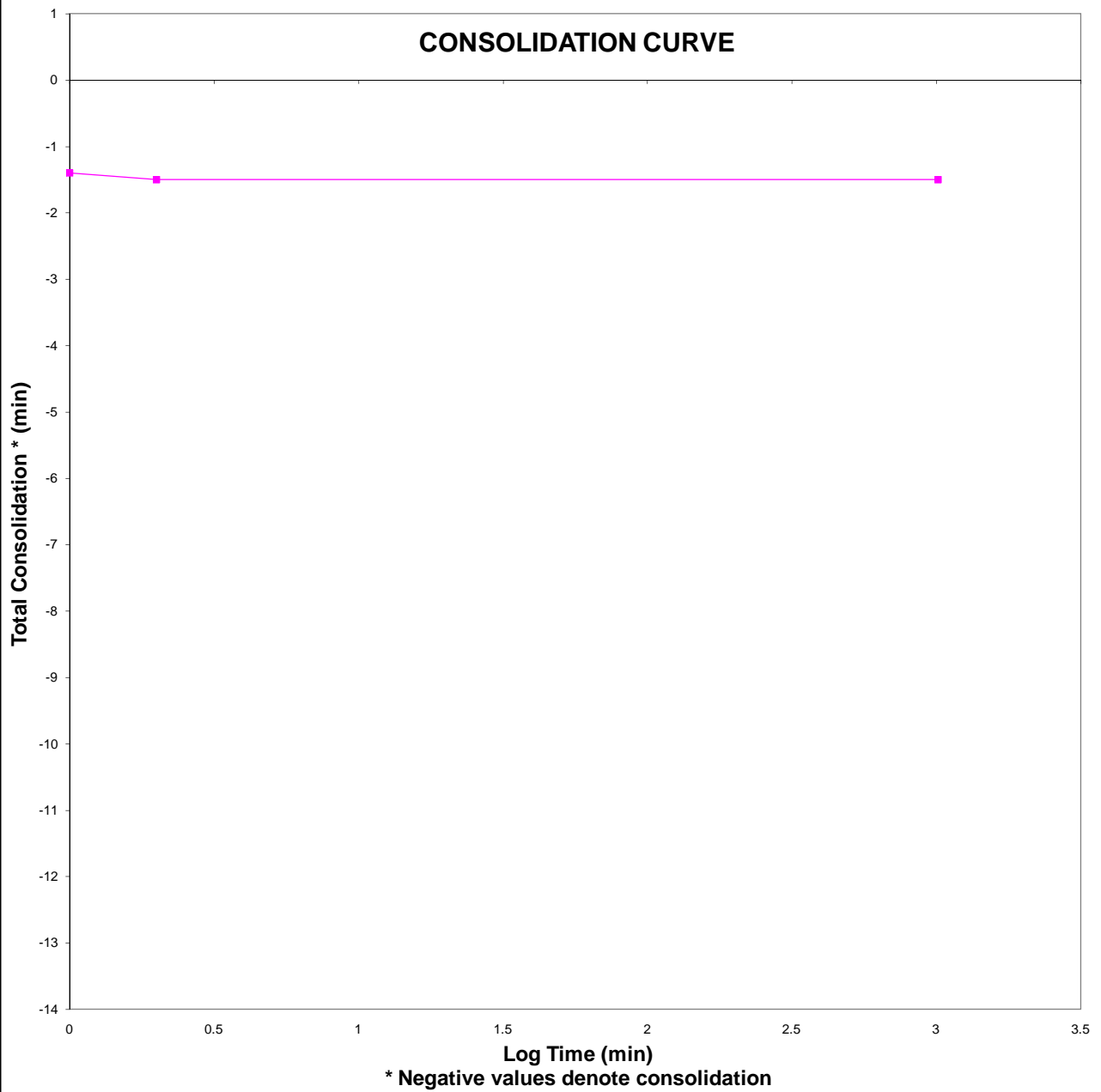
# PERMEABILITY ASTM D5084

## CONSOLIDATION CURVE

Page 4 of 6

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-012  
TEST DATE: 6/3/2009

TESTED BY: SEM  
TRACKING CODE: 5882\_PM  
EQUIPMENT No.: 3



## PERMEABILITY ASTM D5084

## TEST DATA

Page 5 of 6

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-012
TEST DATE:	6/3/2009

TESTED BY:	SEM
TRACKING CODE:	5882_PM
EQUIPMENT No.:	3

[illegible]

## PERMEABILITY ASTM D5084

### TEST DATA (continued)

Page 6 of 6

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-012
TEST DATE:	6/3/2009

TESTED BY:	SEM
TRACKING CODE:	5882_PM
EQUIPMENT No.:	3

[illegible]

# PERMEABILITY ASTM D5084

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-012  
TEST DATE: 6/3/2009

TESTED BY: SEM  
TRACKING CODE: 5882\_PM  
EQUIPMENT No.: 3

TESTING PARAMETER	INITIAL	FINAL
BULK UNIT WEIGHT	128.5 lb/ft <sup>3</sup>	132.6 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	114.4 lb/ft <sup>3</sup>	116.0 lb/ft <sup>3</sup>
MOISTURE CONTENT	12.3 %	14.2 %
PERMEABILITY @ 20°C	1.2E-06 cm/sec	

# PERMEABILITY ASTM D5084

## SPECIMEN CONDITIONS

Page 1 of 6

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-013  
TEST DATE: 6/10/2009

TESTED BY: SEM  
TRACKING CODE: 5884\_PM  
EQUIPMENT No.: 2

<b>MOISTURE CONTENT (Dry Basis)</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>1. MOISTURE TIN NO.</b>	0301-013	0301-013
<b>2. WT MOISTURE TIN (tare weight)</b>	0.00 g	395.27 g
<b>3. WT WET SOIL + TARE</b>	612.20 g	1023.50 g
<b>4. WT DRY SOIL + TARE</b>	529.43 g	924.70 g
5. WT WATER, W <sub>w</sub>	82.77 g	98.80 g
6. WT DRY SOIL, W <sub>s</sub>	529.43 g	529.43 g
7. MOISTURE CONTENT, W	15.63 %	18.66 %

<b>SOIL SPECIMEN DIMENSIONS</b>				
<b>TRIPLICATE ANALYSES</b>	<b>DIAMETER</b>		<b>HEIGHT</b>	
	<b>INITIAL</b>	<b>FINAL</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>No. 1</b>	2.97 in.	2.97 in.	2.65 in.	2.65 in.
<b>No. 2</b>	2.97 in.	2.97 in.	2.66 in.	2.66 in.
<b>No. 3</b>	2.97 in.	2.97 in.	2.67 in.	2.66 in.
Average	2.97 in.	2.97 in.	2.66 in.	2.66 in.

<b>SPECIMEN CONDITIONS</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>Specimen WT, W<sub>o</sub></b>	<b>612.20 g</b>	<b>628.20 g</b>
Area, A <sub>o</sub>	6.93 in <sup>2</sup>	6.93 in <sup>2</sup>
Volume, V <sub>o</sub>	18.43 in <sup>3</sup>	18.41 in <sup>3</sup>
Bulk Unit Weight	126.6 lb/ft <sup>3</sup>	130.0 lb/ft <sup>3</sup>
Dry Unit Weight	109.4 lb/ft <sup>3</sup>	109.6 lb/ft <sup>3</sup>



## BACK-PRESSURE SATURATION

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-013
TEST DATE:	6/10/2009

[illegible]

\* Saturation check - no data available.

## SPECIMEN CONSOLIDATION

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-013
TEST DATE:	6/10/2009

$$\frac{\text{SEM}}{5884\_PM}$$
[illegible]

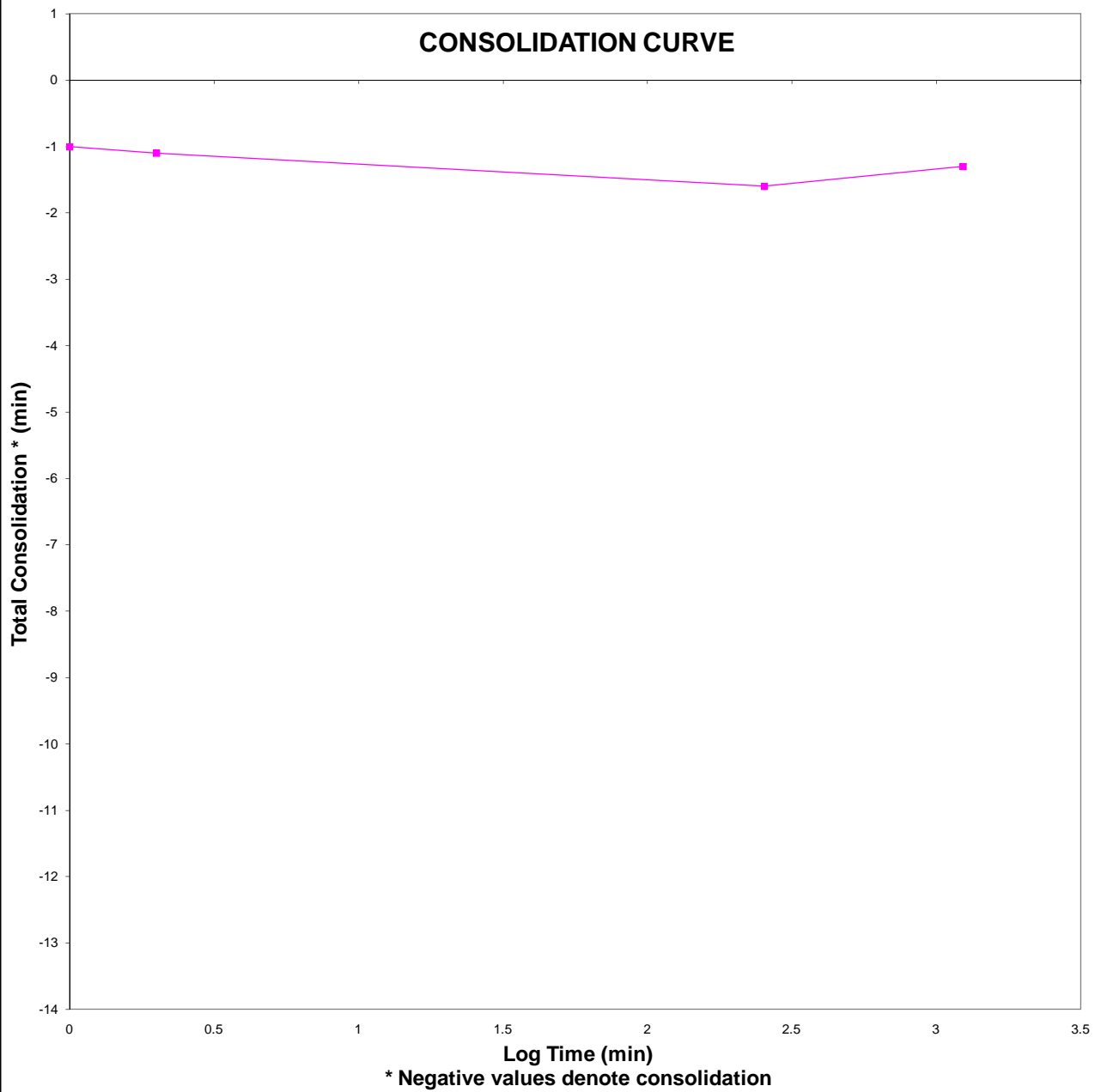
# PERMEABILITY ASTM D5084

## CONSOLIDATION CURVE

Page 4 of 6

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-013  
TEST DATE: 6/10/2009

TESTED BY: SEM  
TRACKING CODE: 5884\_PM  
EQUIPMENT No.: 2



## PERMEABILITY ASTM D5084

## TEST DATA

Page 5 of 6

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-013
TEST DATE:	6/10/2009

TESTED BY:	SEM
TRACKING CODE:	5884_PM
EQUIPMENT No.:	2

[illegible]

**TEST DATA (continued)**

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-013
TEST DATE:	6/10/2009

TESTED BY:	SEM
TRACKING CODE:	5884_PM
EQUIPMENT No.:	2

[illegible]

# PERMEABILITY ASTM D5084

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-013  
TEST DATE: 6/10/2009

TESTED BY: SEM  
TRACKING CODE: 5884\_PM  
EQUIPMENT No.: 2

TESTING PARAMETER	INITIAL	FINAL
BULK UNIT WEIGHT	126.6 lb/ft <sup>3</sup>	130.0 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	109.4 lb/ft <sup>3</sup>	109.6 lb/ft <sup>3</sup>
MOISTURE CONTENT	15.6 %	18.7 %
PERMEABILITY @ 20°C	2.9E-08 cm/sec	

# PERMEABILITY ASTM D5084

## SPECIMEN CONDITIONS

Page 1 of 6

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-014  
TEST DATE: 6/10/2009

TESTED BY: SEM  
TRACKING CODE: 5891\_PM  
EQUIPMENT No.: 7B

<b>MOISTURE CONTENT (Dry Basis)</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>1. MOISTURE TIN NO.</b>	0301-014	0301-014
<b>2. WT MOISTURE TIN (tare weight)</b>	0.00 g	395.26 g
<b>3. WT WET SOIL + TARE</b>	738.70 g	1135.20 g
<b>4. WT DRY SOIL + TARE</b>	619.94 g	1015.20 g
5. WT WATER, W <sub>w</sub>	118.76 g	120.00 g
6. WT DRY SOIL, W <sub>s</sub>	619.94 g	619.94 g
7. MOISTURE CONTENT, W	19.16 %	19.36 %

<b>SOIL SPECIMEN DIMENSIONS</b>				
<b>TRIPLICATE ANALYSES</b>	<b>DIAMETER</b>		<b>HEIGHT</b>	
	<b>INITIAL</b>	<b>FINAL</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>No. 1</b>	2.97 in.	2.97 in.	3.10 in.	3.10 in.
<b>No. 2</b>	2.97 in.	2.97 in.	3.11 in.	3.10 in.
<b>No. 3</b>	2.97 in.	2.97 in.	3.11 in.	3.11 in.
Average	2.97 in.	2.97 in.	3.11 in.	3.10 in.

<b>SPECIMEN CONDITIONS</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>Specimen WT, W<sub>o</sub></b>	<b>738.70 g</b>	<b>740.00 g</b>
Area, A <sub>o</sub>	6.93 in <sup>2</sup>	6.93 in <sup>2</sup>
Volume, V <sub>o</sub>	21.52 in <sup>3</sup>	21.50 in <sup>3</sup>
Bulk Unit Weight	130.7 lb/ft <sup>3</sup>	131.1 lb/ft <sup>3</sup>
Dry Unit Weight	109.7 lb/ft <sup>3</sup>	109.9 lb/ft <sup>3</sup>

## BACK-PRESSURE SATURATION

TESTED BY:	SEM
TRACKING CODE:	5891_PM
EQUIPMENT No.:	7B

\* Saturation check - no data available.



## SPECIMEN CONSOLIDATION

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-014
TEST DATE:	6/10/2009

SEM  
5891\_PM  
7B

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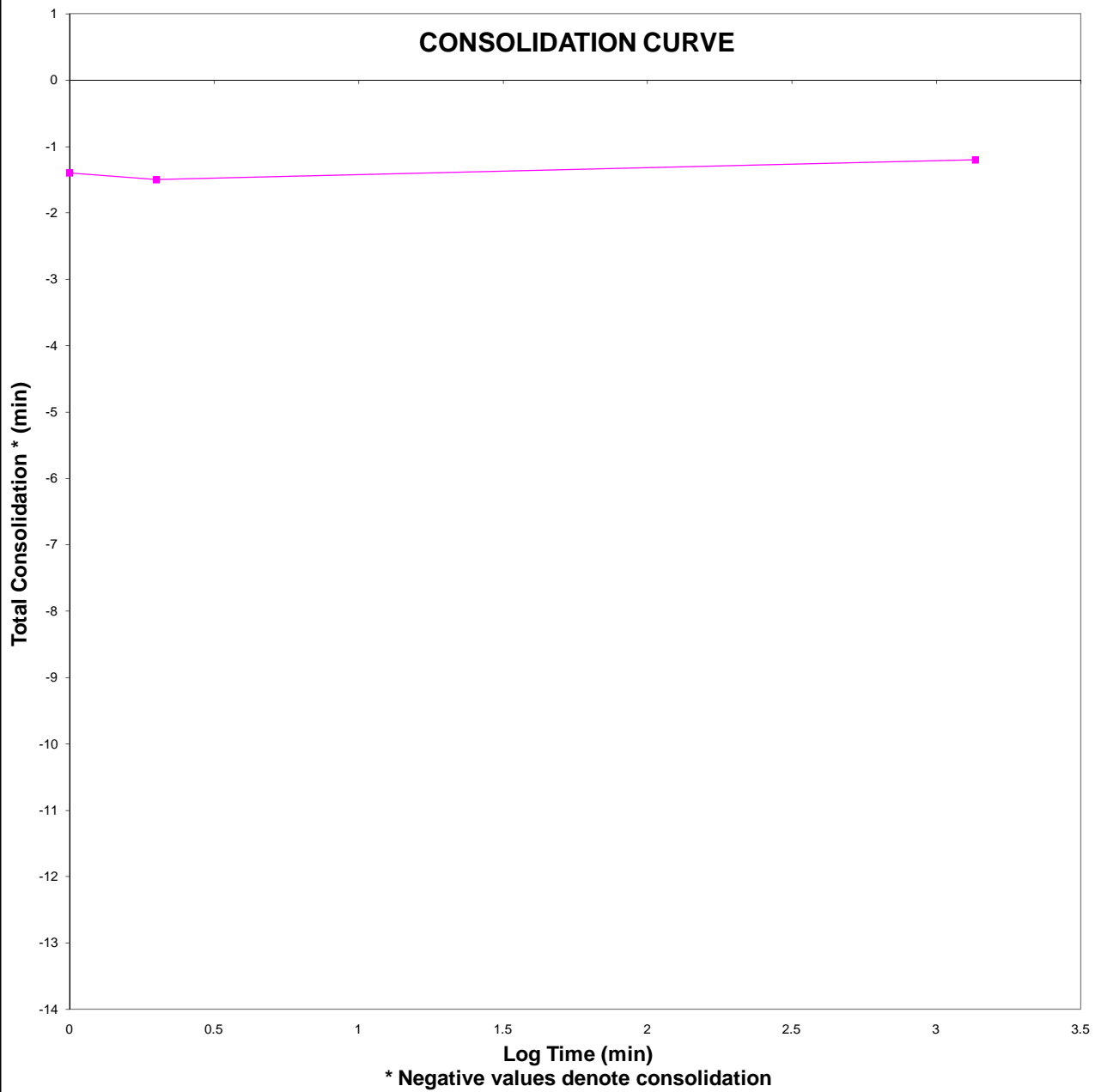
# PERMEABILITY ASTM D5084

## CONSOLIDATION CURVE

Page 4 of 6

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-014  
TEST DATE: 6/10/2009

TESTED BY: SEM  
TRACKING CODE: 5891\_PM  
EQUIPMENT No.: 7B



## PERMEABILITY ASTM D5084

## TEST DATA

Page 5 of 6

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-014
TEST DATE:	6/10/2009

TESTED BY:	SEM
TRACKING CODE:	5891_PM
EQUIPMENT No.:	7B

[illegible]

**TEST DATA (continued)**

Page 6 of 6

TESTED BY:	SEM
TRACKING CODE:	5891_PM
EQUIPMENT No.:	7B

[illegible]

# PERMEABILITY ASTM D5084

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-014  
TEST DATE: 6/10/2009

TESTED BY: SEM  
TRACKING CODE: 5891\_PM  
EQUIPMENT No.: 7B

TESTING PARAMETER	INITIAL	FINAL
BULK UNIT WEIGHT	130.7 lb/ft <sup>3</sup>	131.1 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	109.7 lb/ft <sup>3</sup>	109.9 lb/ft <sup>3</sup>
MOISTURE CONTENT	19.2 %	19.4 %
PERMEABILITY @ 20°C	5.7E-08 cm/sec	

# PERMEABILITY ASTM D5084

## SPECIMEN CONDITIONS

Page 1 of 6

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-015  
TEST DATE: 6/23/2009

TESTED BY: SEM  
TRACKING CODE: 5889\_PM  
EQUIPMENT No.: 5

<b>MOISTURE CONTENT (Dry Basis)</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>1. MOISTURE TIN NO.</b>	0301-015	0301-015
<b>2. WT MOISTURE TIN (tare weight)</b>	0.00 <b>g</b>	229.93 <b>g</b>
<b>3. WT WET SOIL + TARE</b>	503.08 <b>g</b>	748.60 <b>g</b>
<b>4. WT DRY SOIL + TARE</b>	429.57 <b>g</b>	659.50 <b>g</b>
5. WT WATER, W <sub>w</sub>	73.51 <b>g</b>	89.10 <b>g</b>
6. WT DRY SOIL, W <sub>s</sub>	429.57 <b>g</b>	429.57 <b>g</b>
7. MOISTURE CONTENT, W	17.11 <b>%</b>	20.74 <b>%</b>

<b>SOIL SPECIMEN DIMENSIONS</b>				
<b>TRIPLICATE ANALYSES</b>	<b>DIAMETER</b>		<b>HEIGHT</b>	
	<b>INITIAL</b>	<b>FINAL</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>No. 1</b>	2.93 in.	2.93 in.	2.19 in.	2.19 in.
<b>No. 2</b>	2.94 in.	2.93 in.	2.19 in.	2.19 in.
<b>No. 3</b>	2.94 in.	2.94 in.	2.19 in.	2.18 in.
Average	2.94 in.	2.93 in.	2.19 in.	2.19 in.

<b>SPECIMEN CONDITIONS</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>Specimen WT, W<sub>o</sub></b>	<b>503.08 g</b>	<b>518.79 g</b>
Area, A <sub>o</sub>	6.77 in <sup>2</sup>	6.76 in <sup>2</sup>
Volume, V <sub>o</sub>	14.83 in <sup>3</sup>	14.78 in <sup>3</sup>
Bulk Unit Weight	129.2 lb/ft <sup>3</sup>	133.7 lb/ft <sup>3</sup>
Dry Unit Weight	110.3 lb/ft <sup>3</sup>	110.8 lb/ft <sup>3</sup>

## BACK-PRESSURE SATURATION

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-015
TEST DATE:	6/23/2009

[illegible]

\* Saturation check - no data available.

## SPECIMEN CONSOLIDATION

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-015
TEST DATE:	6/23/2009

$$\frac{\text{SEM}}{5889\_PM}$$
[illegible]



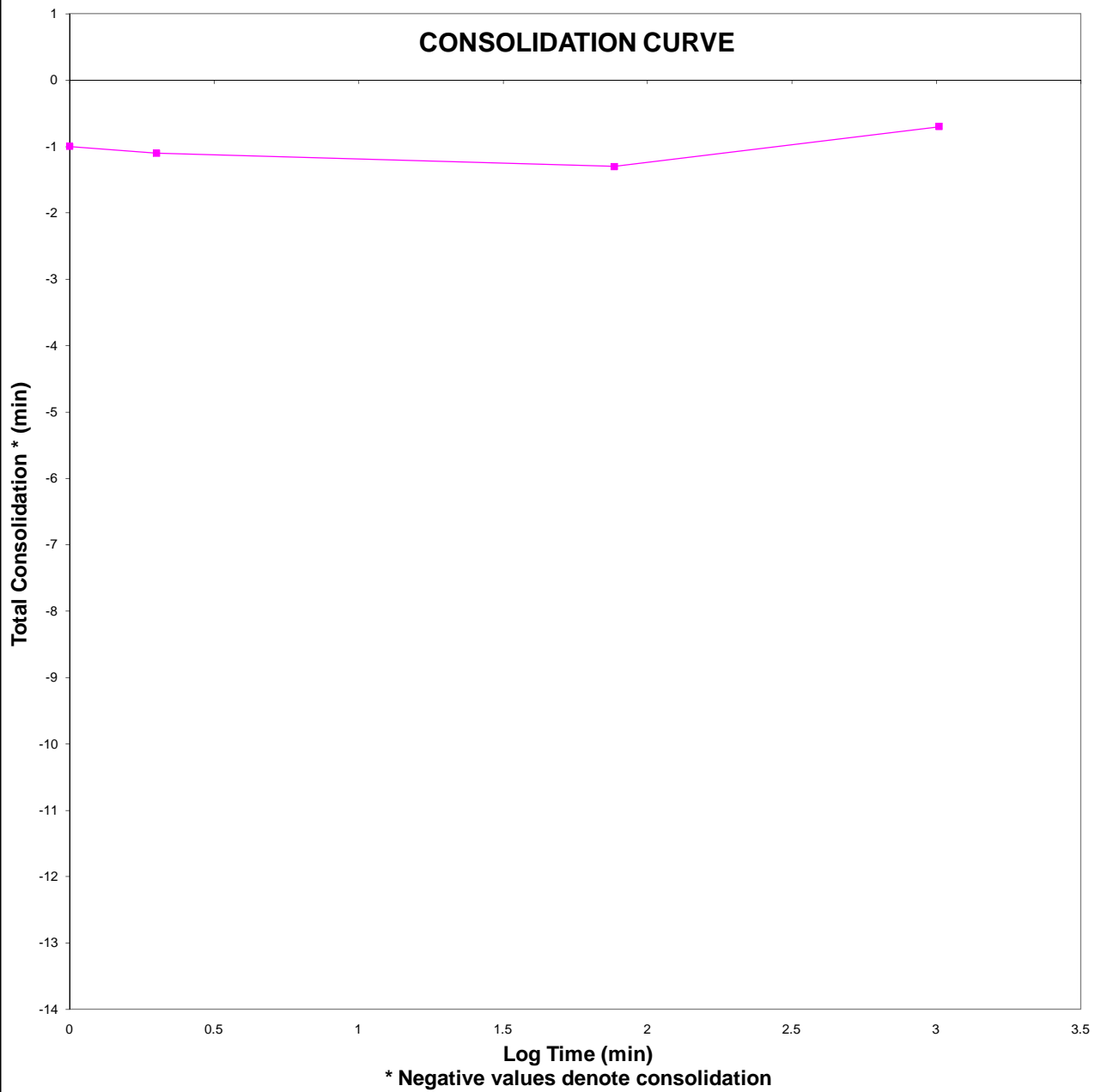
# PERMEABILITY ASTM D5084

## CONSOLIDATION CURVE

Page 4 of 6

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-015  
TEST DATE: 6/23/2009

TESTED BY: SEM  
TRACKING CODE: 5889\_PM  
EQUIPMENT No.: 5



## PERMEABILITY ASTM D5084

## TEST DATA

Page 5 of 6

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-015
TEST DATE:	6/23/2009

TESTED BY:	SEM
TRACKING CODE:	5889_PM
EQUIPMENT No.:	5

[illegible]

**TEST DATA (continued)**

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-015
TEST DATE:	6/23/2009

TESTED BY:	SEM
TRACKING CODE:	5889_PM
EQUIPMENT No.:	5

[illegible]

# PERMEABILITY ASTM D5084

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-015  
TEST DATE: 6/23/2009

TESTED BY: SEM  
TRACKING CODE: 5889\_PM  
EQUIPMENT No.: 5

TESTING PARAMETER	INITIAL	FINAL
BULK UNIT WEIGHT	129.2 lb/ft <sup>3</sup>	133.7 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	110.3 lb/ft <sup>3</sup>	110.8 lb/ft <sup>3</sup>
MOISTURE CONTENT	17.1 %	20.7 %
PERMEABILITY @ 20°C	4.3E-08 cm/sec	

# PERMEABILITY ASTM D5084

## SPECIMEN CONDITIONS

Page 1 of 6

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-016  
TEST DATE: 6/23/2009

TESTED BY: SEM  
TRACKING CODE: 5890\_PM  
EQUIPMENT No.: 4

<b>MOISTURE CONTENT (Dry Basis)</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>1. MOISTURE TIN NO.</b>	0301-016	0301-016
<b>2. WT MOISTURE TIN (tare weight)</b>	0.00 g	231.88 g
<b>3. WT WET SOIL + TARE</b>	461.00 g	702.50 g
<b>4. WT DRY SOIL + TARE</b>	385.62 g	617.50 g
5. WT WATER, W <sub>w</sub>	75.38 g	85.00 g
6. WT DRY SOIL, W <sub>s</sub>	385.62 g	385.62 g
7. MOISTURE CONTENT, W	19.55 %	22.04 %

<b>SOIL SPECIMEN DIMENSIONS</b>				
<b>TRIPLICATE ANALYSES</b>	<b>DIAMETER</b>		<b>HEIGHT</b>	
	<b>INITIAL</b>	<b>FINAL</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>No. 1</b>	2.97 in.	2.99 in.	2.03 in.	2.04 in.
<b>No. 2</b>	2.99 in.	2.99 in.	2.04 in.	2.04 in.
<b>No. 3</b>	2.99 in.	2.99 in.	2.05 in.	2.05 in.
Average	2.98 in.	2.99 in.	2.04 in.	2.04 in.

<b>SPECIMEN CONDITIONS</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>Specimen WT, W<sub>o</sub></b>	<b>461.00 g</b>	<b>470.65 g</b>
Area, A <sub>o</sub>	6.99 in <sup>2</sup>	7.02 in <sup>2</sup>
Volume, V <sub>o</sub>	14.26 in <sup>3</sup>	14.35 in <sup>3</sup>
Bulk Unit Weight	123.2 lb/ft <sup>3</sup>	125.0 lb/ft <sup>3</sup>
Dry Unit Weight	103.0 lb/ft <sup>3</sup>	102.4 lb/ft <sup>3</sup>

## BACK-PRESSURE SATURATION

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-016
TEST DATE:	6/23/2009

[illegible]

\* Saturation check - no data available.

## SPECIMEN CONSOLIDATION

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-016
TEST DATE:	6/23/2009

SEM  
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4

[illegible]

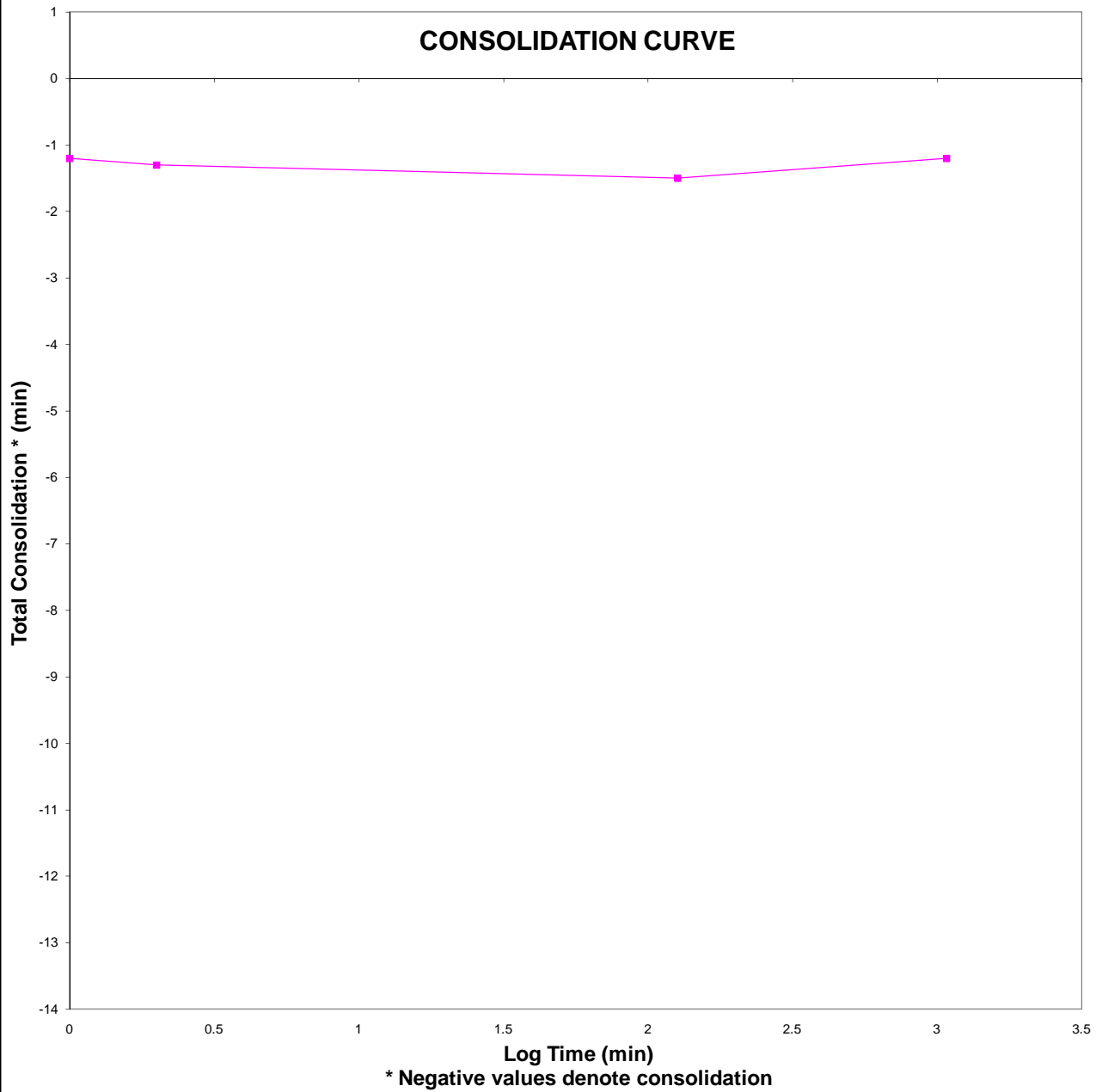
# PERMEABILITY ASTM D5084

## CONSOLIDATION CURVE

Page 4 of 6

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-016  
TEST DATE: 6/23/2009

TESTED BY: SEM  
TRACKING CODE: 5890\_PM  
EQUIPMENT No.: 4





## Page 5 of 6

TESTED BY:	SEM
TRACKING CODE:	5890_PM
EQUIPMENT No.:	4

[illegible]

**TEST DATA (continued)**

Page 6 of 6

TESTED BY:	SEM
TRACKING CODE:	5890_PM
EQUIPMENT No.:	4

[illegible]

# PERMEABILITY ASTM D5084

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-016  
TEST DATE: 6/23/2009

TESTED BY: SEM  
TRACKING CODE: 5890\_PM  
EQUIPMENT No.: 4

TESTING PARAMETER	INITIAL	FINAL
BULK UNIT WEIGHT	123.2 lb/ft <sup>3</sup>	125.0 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	103.0 lb/ft <sup>3</sup>	102.4 lb/ft <sup>3</sup>
MOISTURE CONTENT	19.5 %	22.0 %
PERMEABILITY @ 20°C	3.3E-07 cm/sec	

# PERMEABILITY ASTM D5084

## SPECIMEN CONDITIONS

Page 1 of 6

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-017  
TEST DATE: 6/23/2009

TESTED BY: SEM  
TRACKING CODE: 5912\_PM  
EQUIPMENT No.: 6B

<b>MOISTURE CONTENT (Dry Basis)</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>1. MOISTURE TIN NO.</b>	0301-017	0301-017
<b>2. WT MOISTURE TIN (tare weight)</b>	0.00 g	233.00 g
<b>3. WT WET SOIL + TARE</b>	467.40 g	714.80 g
<b>4. WT DRY SOIL + TARE</b>	377.50 g	610.50 g
5. WT WATER, W <sub>w</sub>	89.90 g	104.30 g
6. WT DRY SOIL, W <sub>s</sub>	377.50 g	377.50 g
7. MOISTURE CONTENT, W	23.81 %	27.63 %

<b>SOIL SPECIMEN DIMENSIONS</b>				
<b>TRIPLICATE ANALYSES</b>	<b>DIAMETER</b>		<b>HEIGHT</b>	
	<b>INITIAL</b>	<b>FINAL</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>No. 1</b>	3.01 in.	3.01 in.	2.16 in.	2.15 in.
<b>No. 2</b>	3.01 in.	3.01 in.	2.16 in.	2.16 in.
<b>No. 3</b>	3.01 in.	3.01 in.	2.16 in.	2.16 in.
Average	3.01 in.	3.01 in.	2.16 in.	2.16 in.

<b>SPECIMEN CONDITIONS</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>Specimen WT, W<sub>o</sub></b>	<b>467.40 g</b>	<b>481.86 g</b>
Area, A <sub>o</sub>	7.12 in <sup>2</sup>	7.12 in <sup>2</sup>
Volume, V <sub>o</sub>	15.37 in <sup>3</sup>	15.35 in <sup>3</sup>
Bulk Unit Weight	115.8 lb/ft <sup>3</sup>	119.6 lb/ft <sup>3</sup>
Dry Unit Weight	93.6 lb/ft <sup>3</sup>	93.7 lb/ft <sup>3</sup>

## BACK-PRESSURE SATURATION

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-017
TEST DATE:	6/23/2009

[illegible]

\* Saturation check - no data available.

## SPECIMEN CONSOLIDATION

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-017
TEST DATE:	6/23/2009

SEM  
5912\_PM  
6B

[illegible]

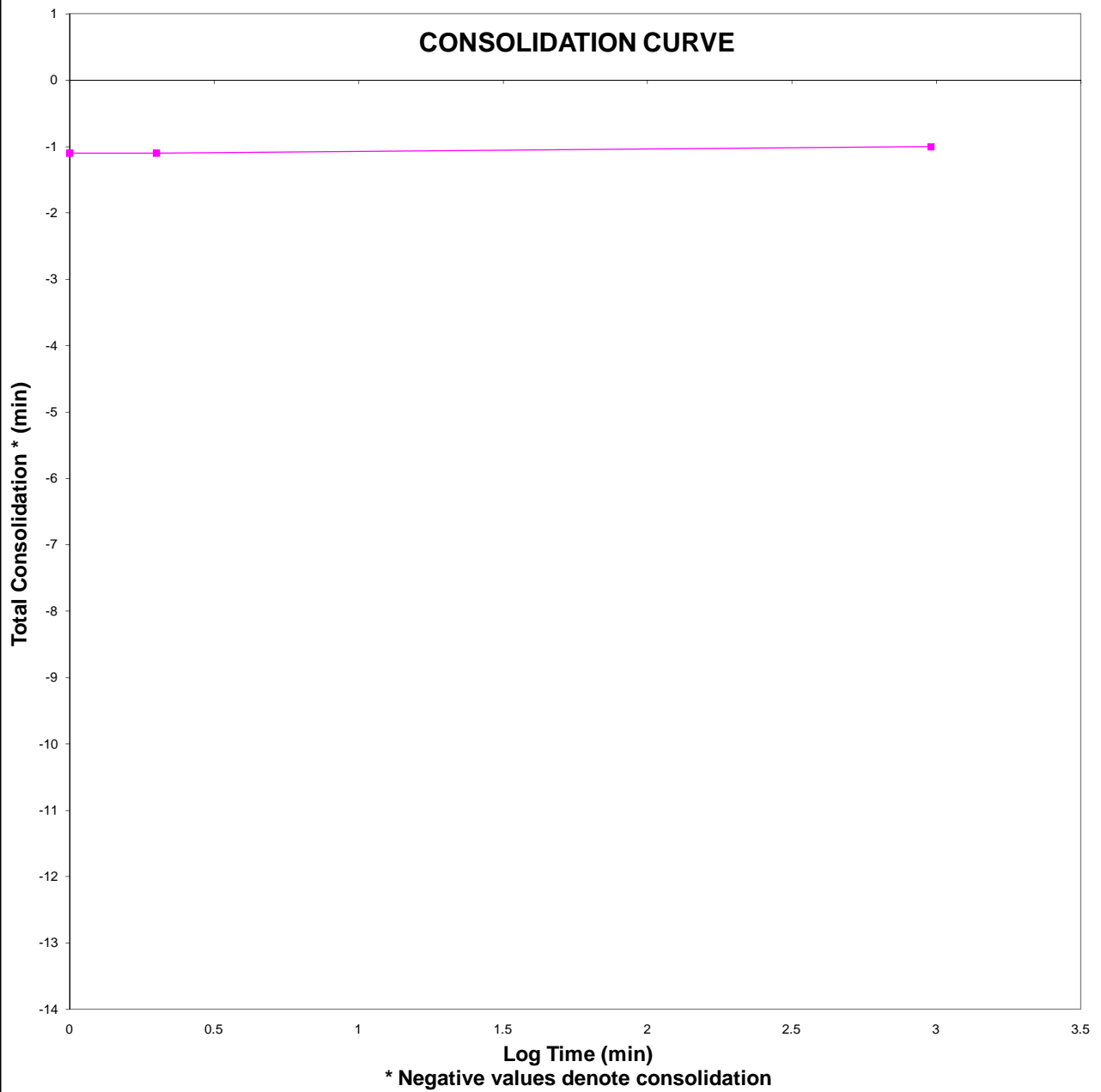
# PERMEABILITY ASTM D5084

## CONSOLIDATION CURVE

Page 4 of 6

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-017  
TEST DATE: 6/23/2009

TESTED BY: SEM  
TRACKING CODE: 5912\_PM  
EQUIPMENT No.: 6B



## PERMEABILITY ASTM D5084

## TEST DATA

Page 5 of 6

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-017
TEST DATE:	6/23/2009

TESTED BY:	SEM
TRACKING CODE:	5912_PM
EQUIPMENT No.:	6B

[illegible]



**TEST DATA (continued)**

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-017
TEST DATE:	6/23/2009

TESTED BY:	SEM
TRACKING CODE:	5912_PM
EQUIPMENT No.:	6B

[illegible]

# PERMEABILITY ASTM D5084

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-017  
TEST DATE: 6/23/2009

TESTED BY: SEM  
TRACKING CODE: 5912\_PM  
EQUIPMENT No.: 6B

TESTING PARAMETER	INITIAL	FINAL
BULK UNIT WEIGHT	115.8 lb/ft <sup>3</sup>	119.6 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	93.6 lb/ft <sup>3</sup>	93.7 lb/ft <sup>3</sup>
MOISTURE CONTENT	23.8 %	27.6 %
PERMEABILITY @ 20°C	3.2E-07 cm/sec	

# PERMEABILITY ASTM D5084

## SPECIMEN CONDITIONS

Page 1 of 6

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-018  
TEST DATE: 6/25/2009

TESTED BY: SEM  
TRACKING CODE: 5908\_PM  
EQUIPMENT No.: 1

<b>MOISTURE CONTENT (Dry Basis)</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>1. MOISTURE TIN NO.</b>	0301-018	0301-018
<b>2. WT MOISTURE TIN (tare weight)</b>	0.00 g	231.89 g
<b>3. WT WET SOIL + TARE</b>	536.57 g	779.10 g
<b>4. WT DRY SOIL + TARE</b>	419.81 g	651.70 g
5. WT WATER, W <sub>w</sub>	116.76 g	127.40 g
6. WT DRY SOIL, W <sub>s</sub>	419.81 g	419.81 g
7. MOISTURE CONTENT, W	27.81 %	30.35 %

<b>SOIL SPECIMEN DIMENSIONS</b>				
<b>TRIPLICATE ANALYSES</b>	<b>DIAMETER</b>		<b>HEIGHT</b>	
	<b>INITIAL</b>	<b>FINAL</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>No. 1</b>	2.98 in.	2.98 in.	2.52 in.	2.52 in.
<b>No. 2</b>	2.99 in.	3.00 in.	2.52 in.	2.53 in.
<b>No. 3</b>	3.00 in.	3.00 in.	2.54 in.	2.54 in.
Average	2.99 in.	2.99 in.	2.53 in.	2.53 in.

<b>SPECIMEN CONDITIONS</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>Specimen WT, W<sub>o</sub></b>	<b>536.57 g</b>	<b>547.54 g</b>
Area, A <sub>o</sub>	7.02 in <sup>2</sup>	7.04 in <sup>2</sup>
Volume, V <sub>o</sub>	17.74 in <sup>3</sup>	17.80 in <sup>3</sup>
Bulk Unit Weight	115.2 lb/ft <sup>3</sup>	117.2 lb/ft <sup>3</sup>
Dry Unit Weight	90.1 lb/ft <sup>3</sup>	89.9 lb/ft <sup>3</sup>

## BACK-PRESSURE SATURATION

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-018
TEST DATE:	6/25/2009

[illegible]

\* Saturation check - no data available.

## SPECIMEN CONSOLIDATION

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-018
TEST DATE:	6/25/2009

SEM  
5908\_PM  
1

[illegible]

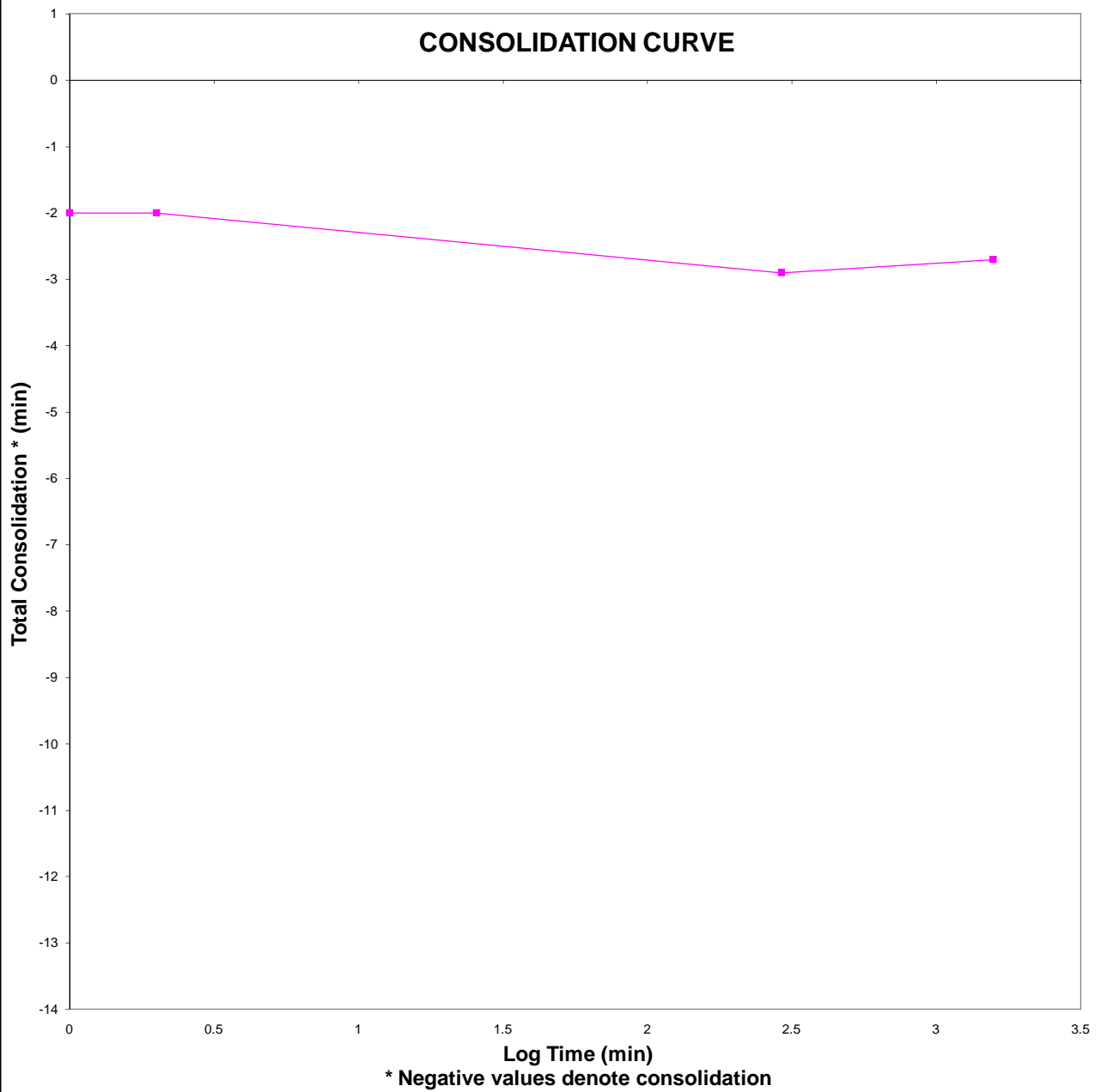
# PERMEABILITY ASTM D5084

## CONSOLIDATION CURVE

Page 4 of 6

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-018  
TEST DATE: 6/25/2009

TESTED BY: SEM  
TRACKING CODE: 5908\_PM  
EQUIPMENT No.: 1



## PERMEABILITY ASTM D5084

## TEST DATA

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PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-018
TEST DATE:	6/25/2009

TESTED BY:	SEM
TRACKING CODE:	5908_PM
EQUIPMENT No.:	1

[illegible]

## PERMEABILITY ASTM D5084

**TEST DATA (continued)**

Page 6 of 6

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-018
TEST DATE:	6/25/2009

TESTED BY:	SEM
TRACKING CODE:	5908_PM
EQUIPMENT No.:	1

[illegible]



# PERMEABILITY ASTM D5084

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-018  
TEST DATE: 6/25/2009

TESTED BY: SEM  
TRACKING CODE: 5908\_PM  
EQUIPMENT No.: 1

TESTING PARAMETER	INITIAL	FINAL
BULK UNIT WEIGHT	115.2 lb/ft <sup>3</sup>	117.2 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	90.1 lb/ft <sup>3</sup>	89.9 lb/ft <sup>3</sup>
MOISTURE CONTENT	27.8 %	30.3 %
PERMEABILITY @ 20°C	2.2E-07 cm/sec	

# PERMEABILITY ASTM D5084

## SPECIMEN CONDITIONS

Page 1 of 6

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-019  
TEST DATE: 6/30/2009

TESTED BY: SEM  
TRACKING CODE: 5909\_PM  
EQUIPMENT No.: 4

<b>MOISTURE CONTENT (Dry Basis)</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>1. MOISTURE TIN NO.</b>	0301-019	0301-019
<b>2. WT MOISTURE TIN (tare weight)</b>	0.00 g	199.84 g
<b>3. WT WET SOIL + TARE</b>	490.82 g	705.70 g
<b>4. WT DRY SOIL + TARE</b>	395.83 g	595.67 g
5. WT WATER, W <sub>w</sub>	94.99 g	110.03 g
6. WT DRY SOIL, W <sub>s</sub>	395.83 g	395.83 g
7. MOISTURE CONTENT, W	24.00 %	27.80 %

<b>SOIL SPECIMEN DIMENSIONS</b>				
<b>TRIPLICATE ANALYSES</b>	<b>DIAMETER</b>		<b>HEIGHT</b>	
	<b>INITIAL</b>	<b>FINAL</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>No. 1</b>	2.99 in.	3.02 in.	2.30 in.	2.31 in.
<b>No. 2</b>	2.99 in.	3.02 in.	2.31 in.	2.33 in.
<b>No. 3</b>	3.00 in.	3.00 in.	2.31 in.	2.31 in.
Average	2.99 in.	3.01 in.	2.31 in.	2.32 in.

<b>SPECIMEN CONDITIONS</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>Specimen WT, W<sub>o</sub></b>	<b>490.82 g</b>	<b>505.79 g</b>
Area, A <sub>o</sub>	7.04 in <sup>2</sup>	7.13 in <sup>2</sup>
Volume, V <sub>o</sub>	16.23 in <sup>3</sup>	16.52 in <sup>3</sup>
Bulk Unit Weight	115.2 lb/ft <sup>3</sup>	116.6 lb/ft <sup>3</sup>
Dry Unit Weight	92.9 lb/ft <sup>3</sup>	91.3 lb/ft <sup>3</sup>

## BACK-PRESSURE SATURATION

TESTED BY:	SEM
TRACKING CODE:	5909_PM
EQUIPMENT No.:	4

\* Saturation check - no data available.

## SPECIMEN CONSOLIDATION

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-019
TEST DATE:	6/30/2009

SEM  
5909\_PM  
4

[illegible]

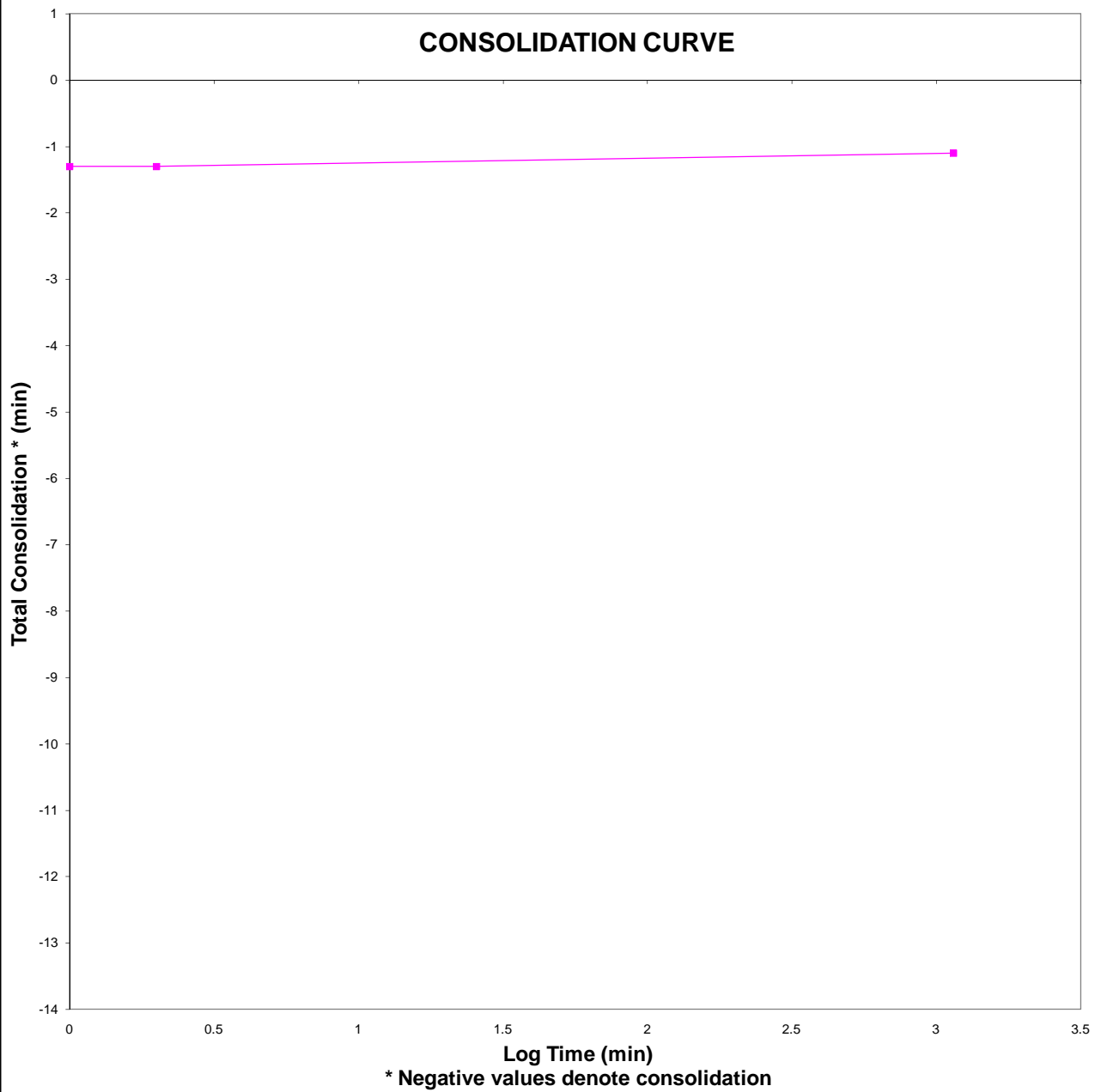
# PERMEABILITY ASTM D5084

## CONSOLIDATION CURVE

Page 4 of 6

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-019  
TEST DATE: 6/30/2009

TESTED BY: SEM  
TRACKING CODE: 5909\_PM  
EQUIPMENT No.: 4



## PERMEABILITY ASTM D5084

## TEST DATA

Page 5 of 6

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-019
TEST DATE:	6/30/2009

TESTED BY:	SEM
TRACKING CODE:	5909_PM
EQUIPMENT No.:	4

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**TEST DATA (continued)**

Page 6 of 6

TESTED BY:	SEM
TRACKING CODE:	5909_PM
EQUIPMENT No.:	4

[illegible]

# PERMEABILITY ASTM D5084

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-019  
TEST DATE: 6/30/2009

TESTED BY: SEM  
TRACKING CODE: 5909\_PM  
EQUIPMENT No.: 4

TESTING PARAMETER	INITIAL	FINAL
BULK UNIT WEIGHT	115.2 lb/ft <sup>3</sup>	116.6 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	92.9 lb/ft <sup>3</sup>	91.3 lb/ft <sup>3</sup>
MOISTURE CONTENT	24.0 %	27.8 %
PERMEABILITY @ 20°C	2.1E-07 cm/sec	



# PERMEABILITY ASTM D5084

## SPECIMEN CONDITIONS

Page 1 of 6

PROJECT: Norwich MGP  
 PROJECT No.: SE-0301  
 SAMPLE No.: 0301-020  
 TEST DATE: 6/30/2009

TESTED BY: SEM  
 TRACKING CODE: 5910\_PM  
 EQUIPMENT No.: 5

<b>MOISTURE CONTENT (Dry Basis)</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>1. MOISTURE TIN NO.</b>	0301-020	0301-020
<b>2. WT MOISTURE TIN (tare weight)</b>	0.00 g	226.18 g
<b>3. WT WET SOIL + TARE</b>	506.96 g	745.40 g
<b>4. WT DRY SOIL + TARE</b>	407.72 g	633.90 g
5. WT WATER, W <sub>w</sub>	99.24 g	111.50 g
6. WT DRY SOIL, W <sub>s</sub>	407.72 g	407.72 g
7. MOISTURE CONTENT, W	24.34 %	27.35 %

<b>SOIL SPECIMEN DIMENSIONS</b>				
<b>TRIPLICATE</b>	<b>DIAMETER</b>		<b>HEIGHT</b>	
<b>ANALYSES</b>	<b>INITIAL</b>	<b>FINAL</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>No. 1</b>	2.98 in.	2.99 in.	2.36 in.	2.36 in.
<b>No. 2</b>	2.99 in.	2.99 in.	2.36 in.	2.36 in.
<b>No. 3</b>	3.00 in.	3.00 in.	2.36 in.	2.36 in.
Average	2.99 in.	2.99 in.	2.36 in.	2.36 in.

<b>SPECIMEN CONDITIONS</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>Specimen WT, W<sub>o</sub></b>	<b>506.96 g</b>	<b>519.24 g</b>
Area, A <sub>o</sub>	7.02 in <sup>2</sup>	7.04 in <sup>2</sup>
Volume, V <sub>o</sub>	16.57 in <sup>3</sup>	16.61 in <sup>3</sup>
Bulk Unit Weight	116.5 lb/ft <sup>3</sup>	119.1 lb/ft <sup>3</sup>
Dry Unit Weight	93.7 lb/ft <sup>3</sup>	93.5 lb/ft <sup>3</sup>

## BACK-PRESSURE SATURATION

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-020
TEST DATE:	6/30/2009

[illegible]

\* Saturation check - no data available.

## SPECIMEN CONSOLIDATION

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-020
TEST DATE:	6/30/2009

SEM  
5910\_PM  
5

[illegible]

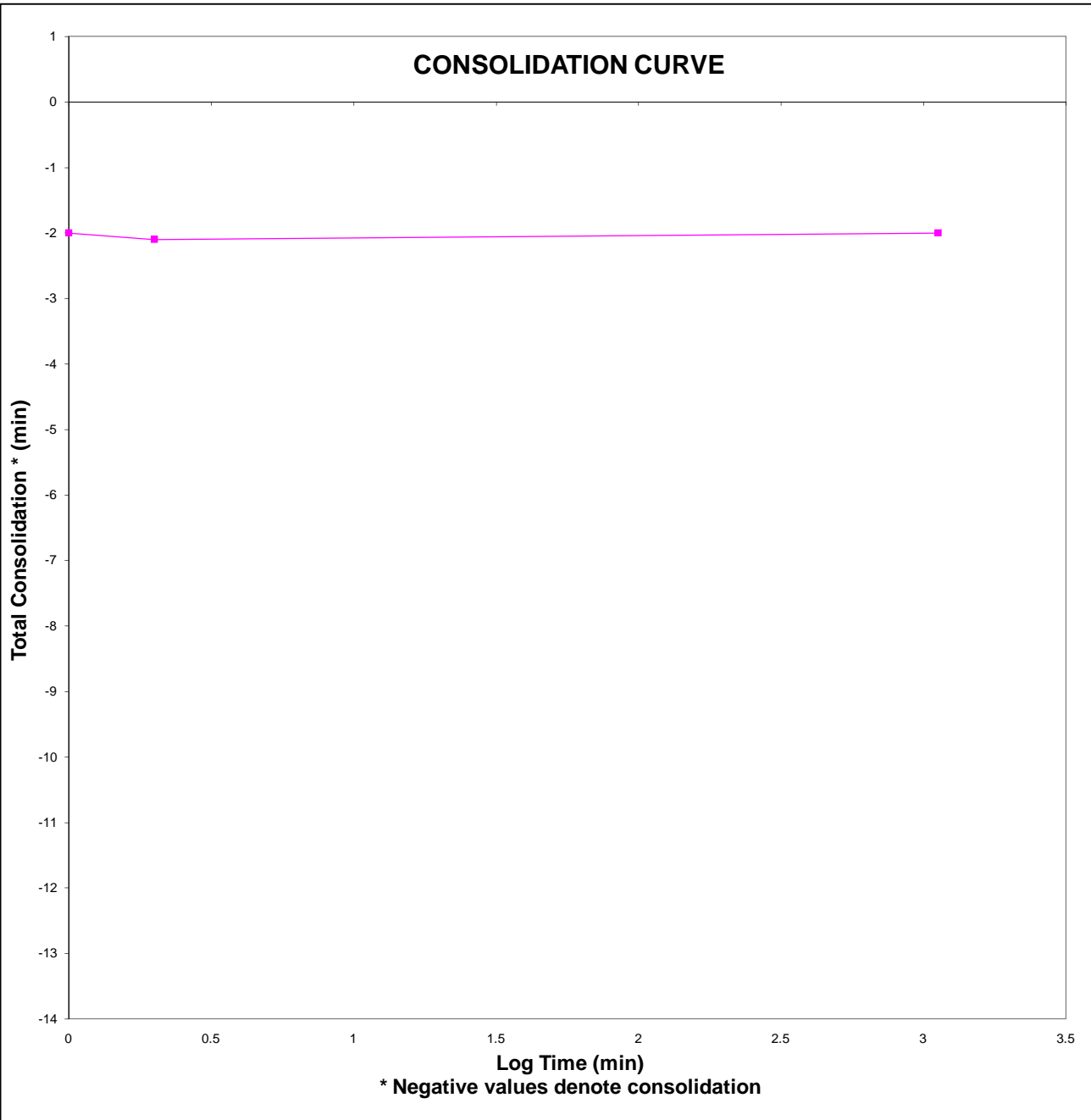
# PERMEABILITY ASTM D5084

## CONSOLIDATION CURVE

Page 4 of 6

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-020  
TEST DATE: 6/30/2009

TESTED BY: SEM  
TRACKING CODE: 5910\_PM  
EQUIPMENT No.: 5



## PERMEABILITY ASTM D5084

## TEST DATA

Page 5 of 6

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-020
TEST DATE:	6/30/2009

TESTED BY:	SEM
TRACKING CODE:	5910_PM
EQUIPMENT No.:	5

[illegible]

## PERMEABILITY ASTM D5084

### TEST DATA (continued)

Page 6 of 6

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-020
TEST DATE:	6/30/2009

TESTED BY:	SEM
TRACKING CODE:	5910_PM
EQUIPMENT No.:	5

[illegible]

# PERMEABILITY ASTM D5084

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-020  
TEST DATE: 6/30/2009

TESTED BY: SEM  
TRACKING CODE: 5910\_PM  
EQUIPMENT No.: 5

TESTING PARAMETER	INITIAL	FINAL
BULK UNIT WEIGHT	116.5 lb/ft <sup>3</sup>	119.1 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	93.7 lb/ft <sup>3</sup>	93.5 lb/ft <sup>3</sup>
MOISTURE CONTENT	24.3 %	27.3 %
PERMEABILITY @ 20°C	1.4E-07 cm/sec	

# PERMEABILITY ASTM D5084

## SPECIMEN CONDITIONS

Page 1 of 6

PROJECT: Norwich MGP  
 PROJECT No.: SE-0301  
 SAMPLE No.: 0301-021  
 TEST DATE: 8/27/2009

TESTED BY: SEM  
 TRACKING CODE: 6203\_PM  
 EQUIPMENT No.: 1

<b>MOISTURE CONTENT (Dry Basis)</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>1. MOISTURE TIN NO.</b>	0301-021	0301-021
<b>2. WT MOISTURE TIN (tare weight)</b>	0.00 <b>g</b>	227.74 <b>g</b>
<b>3. WT WET SOIL + TARE</b>	217.87 <b>g</b>	452.57 <b>g</b>
<b>4. WT DRY SOIL + TARE</b>	182.31 <b>g</b>	410.05 <b>g</b>
5. WT WATER, W <sub>w</sub>	35.56 <b>g</b>	42.52 <b>g</b>
6. WT DRY SOIL, W <sub>s</sub>	182.31 <b>g</b>	182.31 <b>g</b>
7. MOISTURE CONTENT, W	19.51 <b>%</b>	23.32 <b>%</b>

<b>SOIL SPECIMEN DIMENSIONS</b>				
<b>TRIPLICATE</b>	<b>DIAMETER</b>		<b>HEIGHT</b>	
<b>ANALYSES</b>	<b>INITIAL</b>	<b>FINAL</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>No. 1</b>	2.97 in.	2.97 in.	1.01 in.	1.01 in.
<b>No. 2</b>	2.98 in.	2.98 in.	1.02 in.	1.01 in.
<b>No. 3</b>	2.98 in.	2.98 in.	1.02 in.	1.02 in.
Average	2.98 in.	2.98 in.	1.02 in.	1.01 in.

<b>SPECIMEN CONDITIONS</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>Specimen WT, W<sub>o</sub></b>	<b>217.87 g</b>	<b>225.19 g</b>
Area, A <sub>o</sub>	6.96 in <sup>2</sup>	6.96 in <sup>2</sup>
Volume, V <sub>o</sub>	7.08 in <sup>3</sup>	7.05 in <sup>3</sup>
Bulk Unit Weight	117.3 lb/ft <sup>3</sup>	121.7 lb/ft <sup>3</sup>
Dry Unit Weight	98.2 lb/ft <sup>3</sup>	98.6 lb/ft <sup>3</sup>



## BACK-PRESSURE SATURATION

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-021
TEST DATE:	8/27/2009

[illegible]

\* Saturation check - no data available.

## SPECIMEN CONSOLIDATION

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-021
TEST DATE:	8/27/2009

SEM  
6203\_PM  
1

[illegible]

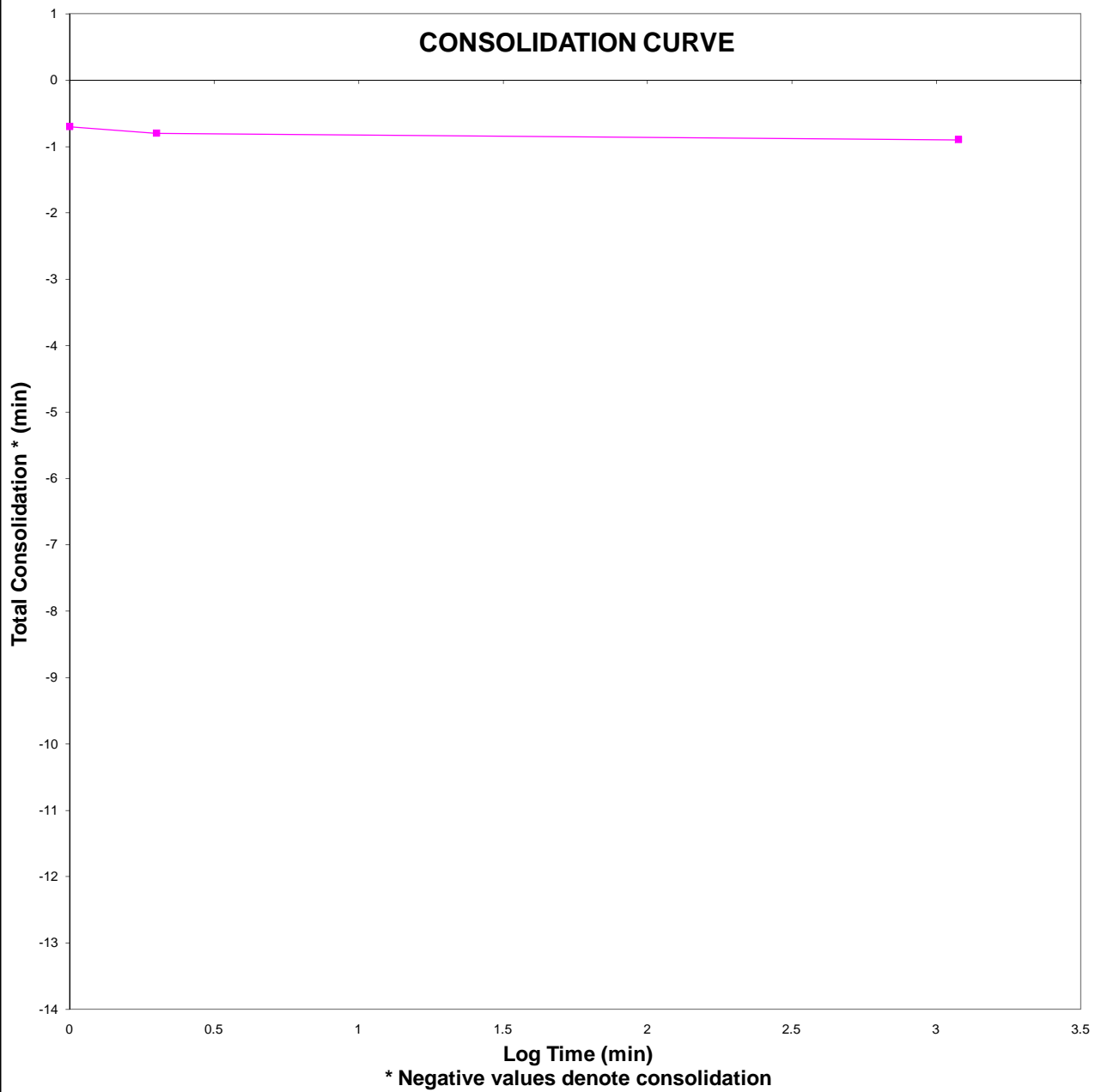
# PERMEABILITY ASTM D5084

## CONSOLIDATION CURVE

Page 4 of 6

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-021  
TEST DATE: 8/27/2009

TESTED BY: SEM  
TRACKING CODE: 6203\_PM  
EQUIPMENT No.: 1



## PERMEABILITY ASTM D5084

## TEST DATA

Page 5 of 6

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-021
TEST DATE:	8/27/2009

TESTED BY:	SEM
TRACKING CODE:	6203_PM
EQUIPMENT No.:	1

[illegible]

**TEST DATA (continued)**

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-021
TEST DATE:	8/27/2009

TESTED BY:	SEM
TRACKING CODE:	6203_PM
EQUIPMENT No.:	1

[illegible]

# PERMEABILITY ASTM D5084

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-021  
TEST DATE: 8/27/2009

TESTED BY: SEM  
TRACKING CODE: 6203\_PM  
EQUIPMENT No.: 1

TESTING PARAMETER	INITIAL	FINAL
BULK UNIT WEIGHT	117.3 lb/ft <sup>3</sup>	121.7 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	98.2 lb/ft <sup>3</sup>	98.6 lb/ft <sup>3</sup>
MOISTURE CONTENT	19.5 %	23.3 %
PERMEABILITY @ 20°C	2.6E-07 cm/sec	

# PERMEABILITY ASTM D5084

## SPECIMEN CONDITIONS

Page 1 of 6

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-022  
TEST DATE: 8/27/2009

TESTED BY: SEM  
TRACKING CODE: 6202\_PM  
EQUIPMENT No.: 2

<b>MOISTURE CONTENT (Dry Basis)</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>1. MOISTURE TIN NO.</b>	0301-022	0301-022
<b>2. WT MOISTURE TIN (tare weight)</b>	0.00 g	230.65 g
<b>3. WT WET SOIL + TARE</b>	393.59 g	633.20 g
<b>4. WT DRY SOIL + TARE</b>	312.10 g	542.75 g
5. WT WATER, W <sub>w</sub>	81.49 g	90.45 g
6. WT DRY SOIL, W <sub>s</sub>	312.10 g	312.10 g
7. MOISTURE CONTENT, W	26.11 %	28.98 %

<b>SOIL SPECIMEN DIMENSIONS</b>				
<b>TRIPLICATE ANALYSES</b>	<b>DIAMETER</b>		<b>HEIGHT</b>	
	<b>INITIAL</b>	<b>FINAL</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>No. 1</b>	2.98 in.	2.98 in.	1.86 in.	1.87 in.
<b>No. 2</b>	2.98 in.	2.98 in.	1.87 in.	1.87 in.
<b>No. 3</b>	2.98 in.	2.98 in.	1.88 in.	1.86 in.
Average	2.98 in.	2.98 in.	1.87 in.	1.87 in.

<b>SPECIMEN CONDITIONS</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>Specimen WT, W<sub>o</sub></b>	<b>393.59 g</b>	<b>402.84 g</b>
Area, A <sub>o</sub>	6.97 in <sup>2</sup>	6.97 in <sup>2</sup>
Volume, V <sub>o</sub>	13.04 in <sup>3</sup>	13.02 in <sup>3</sup>
Bulk Unit Weight	115.0 lb/ft <sup>3</sup>	117.9 lb/ft <sup>3</sup>
Dry Unit Weight	91.2 lb/ft <sup>3</sup>	91.4 lb/ft <sup>3</sup>

## BACK-PRESSURE SATURATION

TESTED BY:	SEM
TRACKING CODE:	6202_PM
EQUIPMENT No.:	2

\* Saturation check - no data available.



## SPECIMEN CONSOLIDATION

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-022
TEST DATE:	8/27/2009

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2

[illegible]

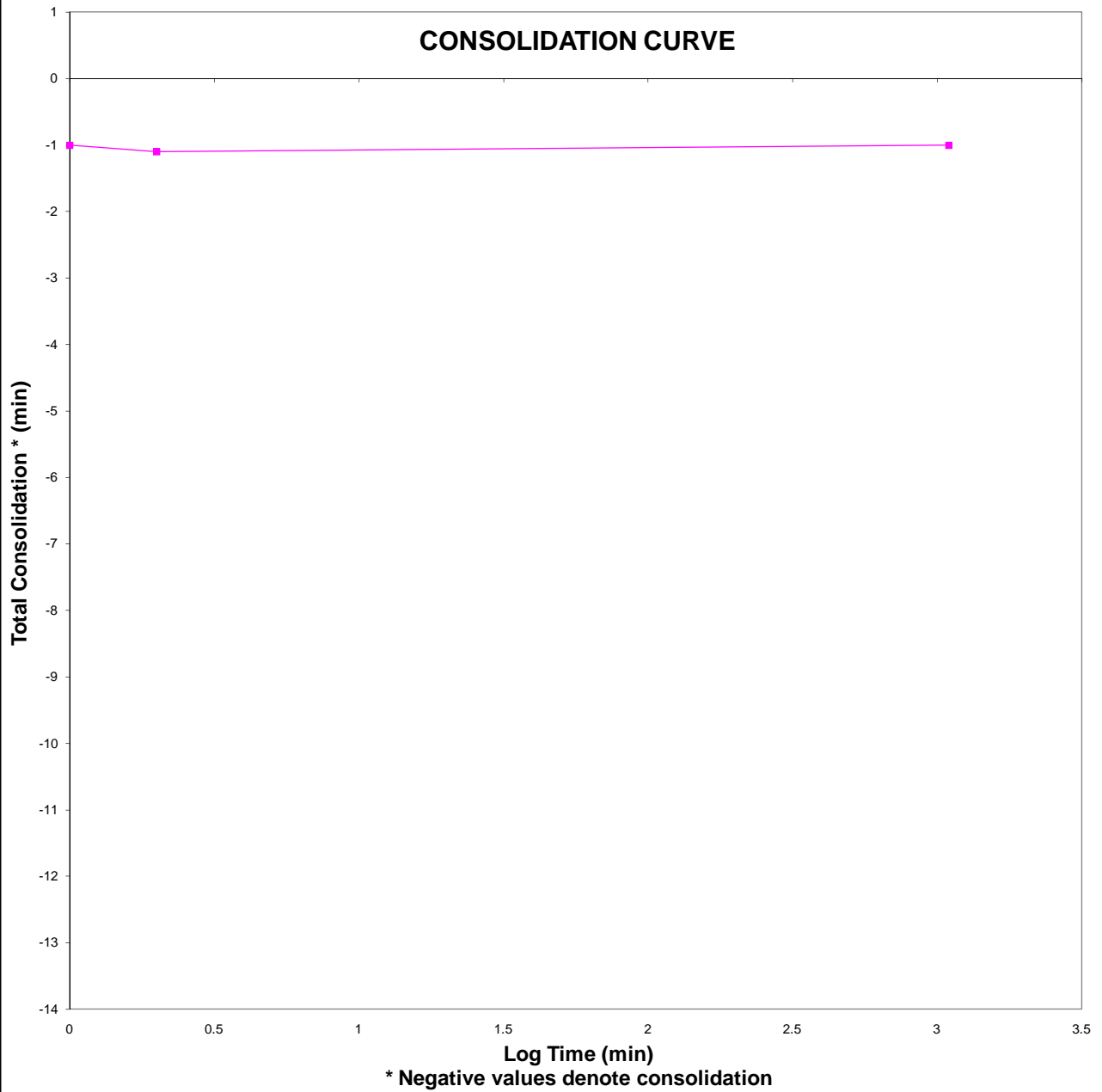
# PERMEABILITY ASTM D5084

## CONSOLIDATION CURVE

Page 4 of 6

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-022  
TEST DATE: 8/27/2009

TESTED BY: SEM  
TRACKING CODE: 6202\_PM  
EQUIPMENT No.: 2



## PERMEABILITY ASTM D5084

## TEST DATA

Page 5 of 6

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-022
TEST DATE:	8/27/2009

TESTED BY:	SEM
TRACKING CODE:	6202_PM
EQUIPMENT No.:	2

[illegible]

**TEST DATA (continued)**

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TESTED BY:	SEM
TRACKING CODE:	6202_PM
EQUIPMENT No.:	2

[illegible]

# PERMEABILITY ASTM D5084

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-022  
TEST DATE: 8/27/2009

TESTED BY: SEM  
TRACKING CODE: 6202\_PM  
EQUIPMENT No.: 2

TESTING PARAMETER	INITIAL	FINAL
BULK UNIT WEIGHT	115.0 lb/ft <sup>3</sup>	117.9 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	91.2 lb/ft <sup>3</sup>	91.4 lb/ft <sup>3</sup>
MOISTURE CONTENT	26.1 %	29.0 %
PERMEABILITY @ 20°C	2.5E-08 cm/sec	

# PERMEABILITY ASTM D5084

## SPECIMEN CONDITIONS

Page 1 of 6

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-023  
TEST DATE: 8/27/2009

TESTED BY: SEM  
TRACKING CODE: 6201\_PM  
EQUIPMENT No.: 3

<b>MOISTURE CONTENT (Dry Basis)</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>1. MOISTURE TIN NO.</b>	0301-023	0301-023
<b>2. WT MOISTURE TIN (tare weight)</b>	0.00 g	239.42 g
<b>3. WT WET SOIL + TARE</b>	363.81 g	613.40 g
<b>4. WT DRY SOIL + TARE</b>	299.19 g	538.61 g
5. WT WATER, W <sub>w</sub>	64.62 g	74.79 g
6. WT DRY SOIL, W <sub>s</sub>	299.19 g	299.19 g
7. MOISTURE CONTENT, W	21.60 %	25.00 %

<b>SOIL SPECIMEN DIMENSIONS</b>				
<b>TRIPLICATE ANALYSES</b>	<b>DIAMETER</b>		<b>HEIGHT</b>	
	<b>INITIAL</b>	<b>FINAL</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>No. 1</b>	2.97 in.	2.97 in.	1.70 in.	1.70 in.
<b>No. 2</b>	2.98 in.	2.98 in.	1.71 in.	1.71 in.
<b>No. 3</b>	2.98 in.	2.98 in.	1.73 in.	1.72 in.
Average	2.98 in.	2.98 in.	1.71 in.	1.71 in.

<b>SPECIMEN CONDITIONS</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>Specimen WT, W<sub>o</sub></b>	<b>363.81 g</b>	<b>374.09 g</b>
Area, A <sub>o</sub>	6.96 in <sup>2</sup>	6.96 in <sup>2</sup>
Volume, V <sub>o</sub>	11.92 in <sup>3</sup>	11.90 in <sup>3</sup>
Bulk Unit Weight	116.2 lb/ft <sup>3</sup>	119.8 lb/ft <sup>3</sup>
Dry Unit Weight	95.6 lb/ft <sup>3</sup>	95.8 lb/ft <sup>3</sup>

## BACK-PRESSURE SATURATION

TESTED BY:	SEM
TRACKING CODE:	6201_PM
EQUIPMENT No.:	3

\* Saturation check - no data available.

## SPECIMEN CONSOLIDATION

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-023
TEST DATE:	8/27/2009

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[illegible]



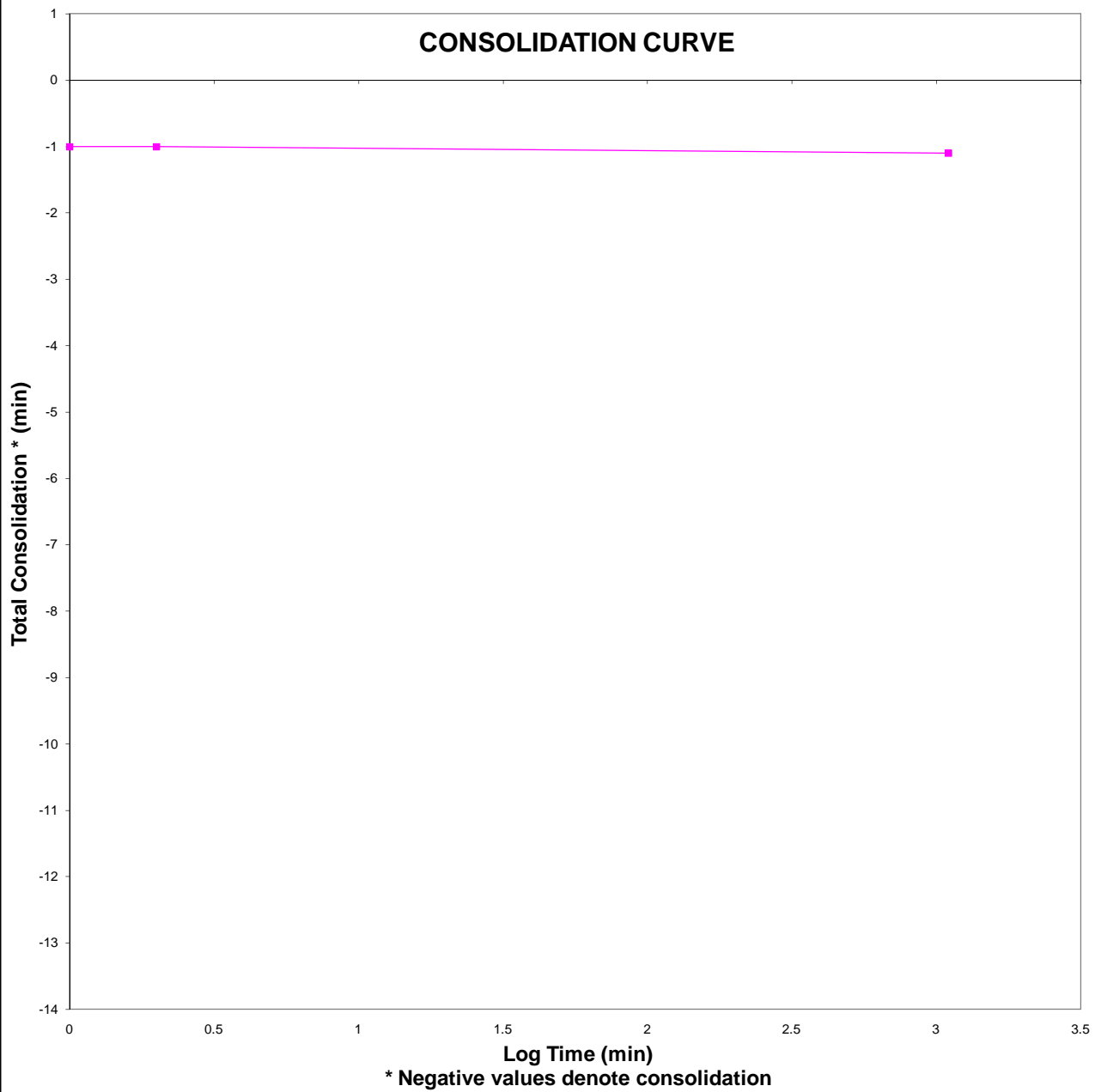
# PERMEABILITY ASTM D5084

## CONSOLIDATION CURVE

Page 4 of 6

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-023  
TEST DATE: 8/27/2009

TESTED BY: SEM  
TRACKING CODE: 6201\_PM  
EQUIPMENT No.: 3



## PERMEABILITY ASTM D5084

## TEST DATA

Page 5 of 6

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-023
TEST DATE:	8/27/2009

TESTED BY:	SEM
TRACKING CODE:	6201_PM
EQUIPMENT No.:	3

[illegible]

## PERMEABILITY ASTM D5084

### TEST DATA (continued)

Page 6 of 6

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-023
TEST DATE:	8/27/2009

TESTED BY:	SEM
TRACKING CODE:	6201_PM
EQUIPMENT No.:	3

[illegible]

# PERMEABILITY ASTM D5084

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-023  
TEST DATE: 8/27/2009

TESTED BY: SEM  
TRACKING CODE: 6201\_PM  
EQUIPMENT No.: 3

TESTING PARAMETER	INITIAL	FINAL
BULK UNIT WEIGHT	116.2 lb/ft <sup>3</sup>	119.8 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	95.6 lb/ft <sup>3</sup>	95.8 lb/ft <sup>3</sup>
MOISTURE CONTENT	21.6 %	25.0 %
PERMEABILITY @ 20°C	5.4E-09 cm/sec	

# PERMEABILITY ASTM D5084

## SPECIMEN CONDITIONS

Page 1 of 6

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-024  
TEST DATE: 8/27/2009

TESTED BY: SEM  
TRACKING CODE: 6200\_PM  
EQUIPMENT No.: 4

<b>MOISTURE CONTENT (Dry Basis)</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>1. MOISTURE TIN NO.</b>	0301-024	0301-024
<b>2. WT MOISTURE TIN (tare weight)</b>	0.00 <b>g</b>	257.14 <b>g</b>
<b>3. WT WET SOIL + TARE</b>	417.15 <b>g</b>	685.20 <b>g</b>
<b>4. WT DRY SOIL + TARE</b>	345.94 <b>g</b>	603.08 <b>g</b>
5. WT WATER, W <sub>w</sub>	71.21 <b>g</b>	82.12 <b>g</b>
6. WT DRY SOIL, W <sub>s</sub>	345.94 <b>g</b>	345.94 <b>g</b>
7. MOISTURE CONTENT, W	20.58 <b>%</b>	23.74 <b>%</b>

<b>SOIL SPECIMEN DIMENSIONS</b>				
<b>TRIPLICATE ANALYSES</b>	<b>DIAMETER</b>		<b>HEIGHT</b>	
	<b>INITIAL</b>	<b>FINAL</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>No. 1</b>	2.98 in.	2.98 in.	1.95 in.	1.95 in.
<b>No. 2</b>	2.98 in.	2.99 in.	1.95 in.	1.95 in.
<b>No. 3</b>	2.99 in.	2.98 in.	1.96 in.	1.96 in.
Average	2.98 in.	2.98 in.	1.95 in.	1.95 in.

<b>SPECIMEN CONDITIONS</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>Specimen WT, W<sub>o</sub></b>	<b>417.15 g</b>	<b>428.15 g</b>
Area, A <sub>o</sub>	6.99 in <sup>2</sup>	6.99 in <sup>2</sup>
Volume, V <sub>o</sub>	13.65 in <sup>3</sup>	13.65 in <sup>3</sup>
Bulk Unit Weight	116.4 lb/ft <sup>3</sup>	119.5 lb/ft <sup>3</sup>
Dry Unit Weight	96.5 lb/ft <sup>3</sup>	96.5 lb/ft <sup>3</sup>

## BACK-PRESSURE SATURATION

TESTED BY:	SEM
TRACKING CODE:	6200_PM
EQUIPMENT No.:	4

\* Saturation check - no data available.

## SPECIMEN CONSOLIDATION

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-024
TEST DATE:	8/27/2009

SEM  
6200\_PM  
4

[illegible]

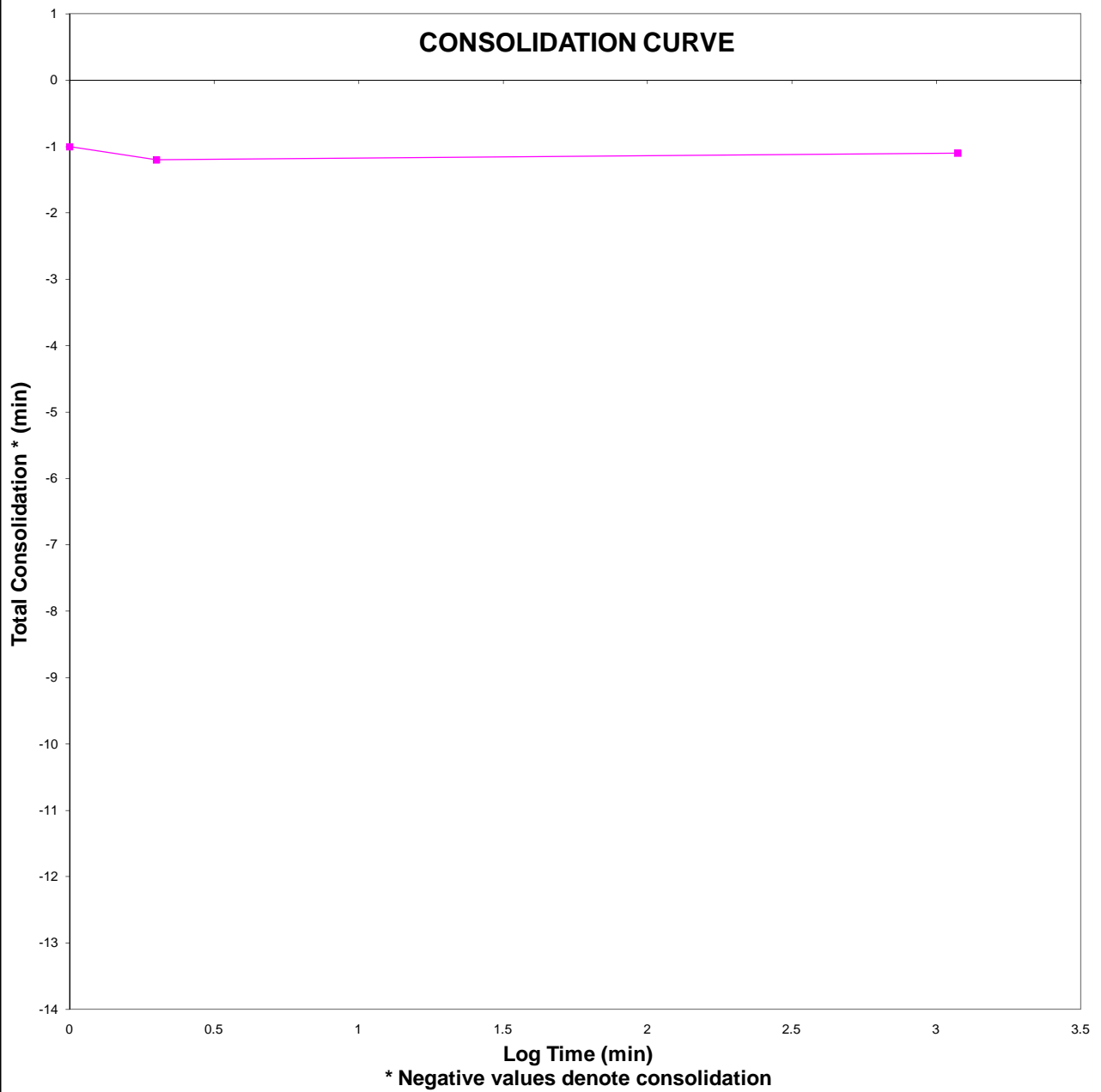
# PERMEABILITY ASTM D5084

## CONSOLIDATION CURVE

Page 4 of 6

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-024  
TEST DATE: 8/27/2009

TESTED BY: SEM  
TRACKING CODE: 6200\_PM  
EQUIPMENT No.: 4





## PERMEABILITY ASTM D5084

## TEST DATA

Page 5 of 6

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-024
TEST DATE:	8/27/2009

TESTED BY:	SEM
TRACKING CODE:	6200_PM
EQUIPMENT No.:	4

[illegible]

**TEST DATA (continued)**

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-024
TEST DATE:	8/27/2009

TESTED BY:	SEM
TRACKING CODE:	6200_PM
EQUIPMENT No.:	4

[illegible]

# PERMEABILITY ASTM D5084

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-024  
TEST DATE: 8/27/2009

TESTED BY: SEM  
TRACKING CODE: 6200\_PM  
EQUIPMENT No.: 4

TESTING PARAMETER	INITIAL	FINAL
BULK UNIT WEIGHT	116.4 lb/ft <sup>3</sup>	119.5 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	96.5 lb/ft <sup>3</sup>	96.5 lb/ft <sup>3</sup>
MOISTURE CONTENT	20.6 %	23.7 %
PERMEABILITY @ 20°C	6.7E-09 cm/sec	

# PERMEABILITY ASTM D5084

## SPECIMEN CONDITIONS

Page 1 of 6

PROJECT: Norwich MGP  
 PROJECT No.: SE-0301  
 SAMPLE No.: 0301-025  
 TEST DATE: 8/28/2009

TESTED BY: SEM  
 TRACKING CODE: 6199\_PM  
 EQUIPMENT No.: 5

<b>MOISTURE CONTENT (Dry Basis)</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>1. MOISTURE TIN NO.</b>	0301-025	0301-025
<b>2. WT MOISTURE TIN (tare weight)</b>	0.00 g	227.66 g
<b>3. WT WET SOIL + TARE</b>	394.67 g	632.20 g
<b>4. WT DRY SOIL + TARE</b>	319.00 g	546.66 g
5. WT WATER, W <sub>w</sub>	75.67 g	85.54 g
6. WT DRY SOIL, W <sub>s</sub>	319.00 g	319.00 g
7. MOISTURE CONTENT, W	23.72 %	26.82 %

<b>SOIL SPECIMEN DIMENSIONS</b>				
<b>TRIPLICATE</b>	<b>DIAMETER</b>		<b>HEIGHT</b>	
<b>ANALYSES</b>	<b>INITIAL</b>	<b>FINAL</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>No. 1</b>	2.98 in.	2.99 in.	1.86 in.	1.86 in.
<b>No. 2</b>	2.98 in.	2.98 in.	1.87 in.	1.87 in.
<b>No. 3</b>	2.99 in.	2.98 in.	1.88 in.	1.87 in.
Average	2.98 in.	2.98 in.	1.87 in.	1.87 in.

<b>SPECIMEN CONDITIONS</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>Specimen WT, W<sub>o</sub></b>	<b>394.67 g</b>	<b>404.59 g</b>
Area, A <sub>o</sub>	6.99 in <sup>2</sup>	6.99 in <sup>2</sup>
Volume, V <sub>o</sub>	13.07 in <sup>3</sup>	13.05 in <sup>3</sup>
Bulk Unit Weight	115.0 lb/ft <sup>3</sup>	118.1 lb/ft <sup>3</sup>
Dry Unit Weight	93.0 lb/ft <sup>3</sup>	93.1 lb/ft <sup>3</sup>

## BACK-PRESSURE SATURATION

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-025
TEST DATE:	8/28/2009

TESTED BY:	SEM
TRACKING CODE:	6199_PM
EQUIPMENT No.:	5

[illegible]

\* Saturation check - no data available.

## SPECIMEN CONSOLIDATION

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-025
TEST DATE:	8/28/2009

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6199\_PM  
5

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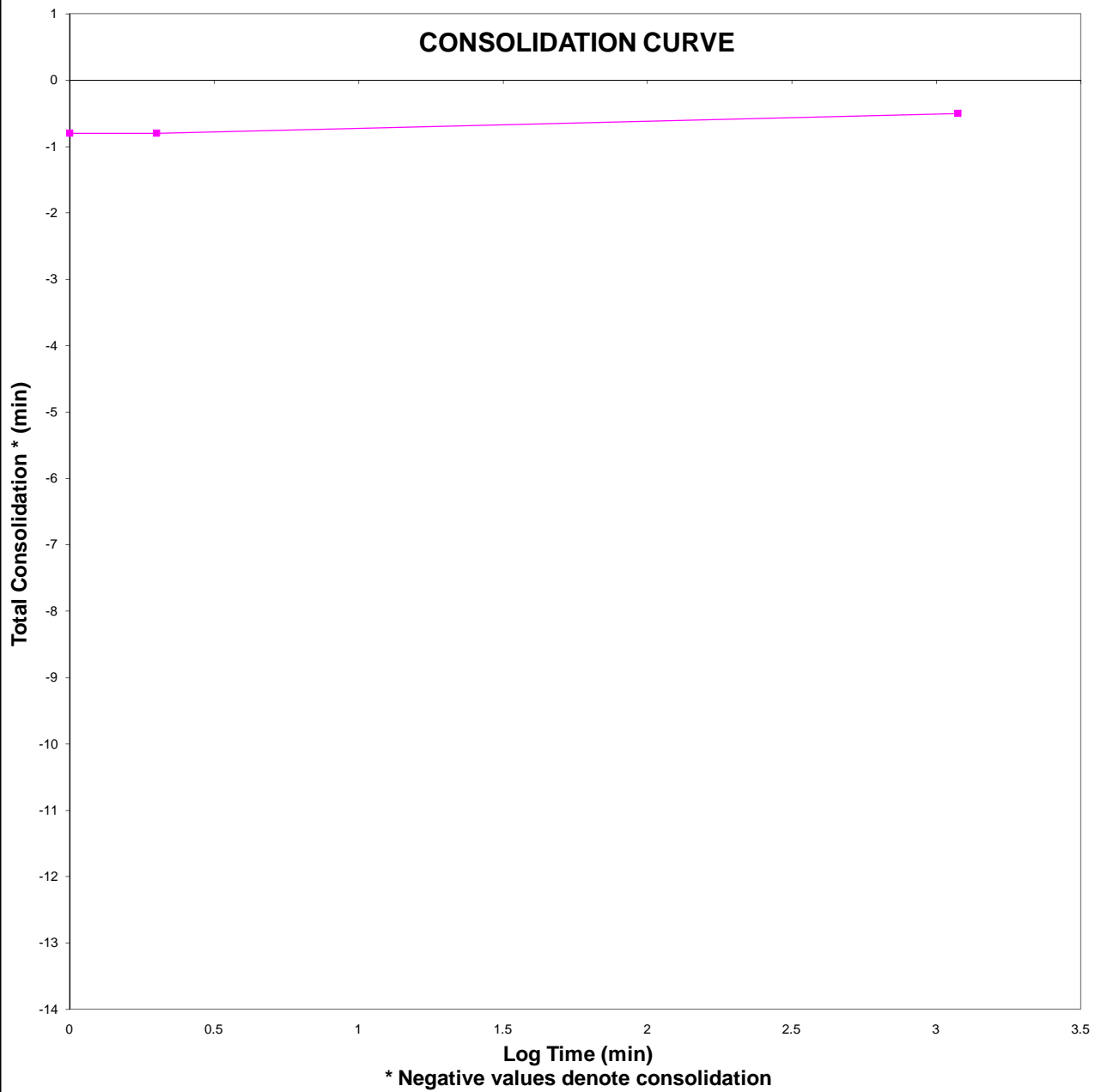
# PERMEABILITY ASTM D5084

## CONSOLIDATION CURVE

Page 4 of 6

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-025  
TEST DATE: 8/28/2009

TESTED BY: SEM  
TRACKING CODE: 6199\_PM  
EQUIPMENT No.: 5



## PERMEABILITY ASTM D5084

## TEST DATA

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PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-025
TEST DATE:	8/28/2009

TESTED BY:	SEM
TRACKING CODE:	6199_PM
EQUIPMENT No.:	5

[illegible]



**TEST DATA (continued)**

Page 6 of 6

TESTED BY:	SEM
TRACKING CODE:	6199_PM
EQUIPMENT No.:	5

[illegible]

# PERMEABILITY ASTM D5084

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-025  
TEST DATE: 8/28/2009

TESTED BY: SEM  
TRACKING CODE: 6199\_PM  
EQUIPMENT No.: 5

TESTING PARAMETER	INITIAL	FINAL
BULK UNIT WEIGHT	115.0 lb/ft <sup>3</sup>	118.1 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	93.0 lb/ft <sup>3</sup>	93.1 lb/ft <sup>3</sup>
MOISTURE CONTENT	23.7 %	26.8 %
PERMEABILITY @ 20°C	1.1E-08 cm/sec	

# PERMEABILITY ASTM D5084

## SPECIMEN CONDITIONS

Page 1 of 6

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-026  
TEST DATE: 9/1/2009

TESTED BY: SEM  
TRACKING CODE: 6198\_PM  
EQUIPMENT No.: 6B

<b>MOISTURE CONTENT (Dry Basis)</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>1. MOISTURE TIN NO.</b>	0301-026	0301-026
<b>2. WT MOISTURE TIN (tare weight)</b>	0.00 g	256.46 g
<b>3. WT WET SOIL + TARE</b>	344.28 g	608.43 g
<b>4. WT DRY SOIL + TARE</b>	273.74 g	530.20 g
5. WT WATER, W <sub>w</sub>	70.54 g	78.23 g
6. WT DRY SOIL, W <sub>s</sub>	273.74 g	273.74 g
7. MOISTURE CONTENT, W	25.77 %	28.58 %

<b>SOIL SPECIMEN DIMENSIONS</b>				
<b>TRIPLICATE ANALYSES</b>	<b>DIAMETER</b>		<b>HEIGHT</b>	
	<b>INITIAL</b>	<b>FINAL</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>No. 1</b>	2.99 in.	2.99 in.	1.66 in.	1.66 in.
<b>No. 2</b>	2.98 in.	2.98 in.	1.67 in.	1.66 in.
<b>No. 3</b>	2.99 in.	2.98 in.	1.66 in.	1.66 in.
Average	2.99 in.	2.98 in.	1.67 in.	1.66 in.

<b>SPECIMEN CONDITIONS</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>Specimen WT, W<sub>o</sub></b>	<b>344.28 g</b>	<b>352.09 g</b>
Area, A <sub>o</sub>	7.01 in <sup>2</sup>	6.99 in <sup>2</sup>
Volume, V <sub>o</sub>	11.68 in <sup>3</sup>	11.60 in <sup>3</sup>
Bulk Unit Weight	112.3 lb/ft <sup>3</sup>	115.6 lb/ft <sup>3</sup>
Dry Unit Weight	89.3 lb/ft <sup>3</sup>	89.9 lb/ft <sup>3</sup>

## BACK-PRESSURE SATURATION

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-026
TEST DATE:	9/1/2009

TESTED BY:	SEM
TRACKING CODE:	6198_PM
EQUIPMENT No.:	6B

[illegible]

\* Saturation check - no data available.

## SPECIMEN CONSOLIDATION

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-026
TEST DATE:	9/1/2009

SEM  
6198\_PM  
6B

[illegible]

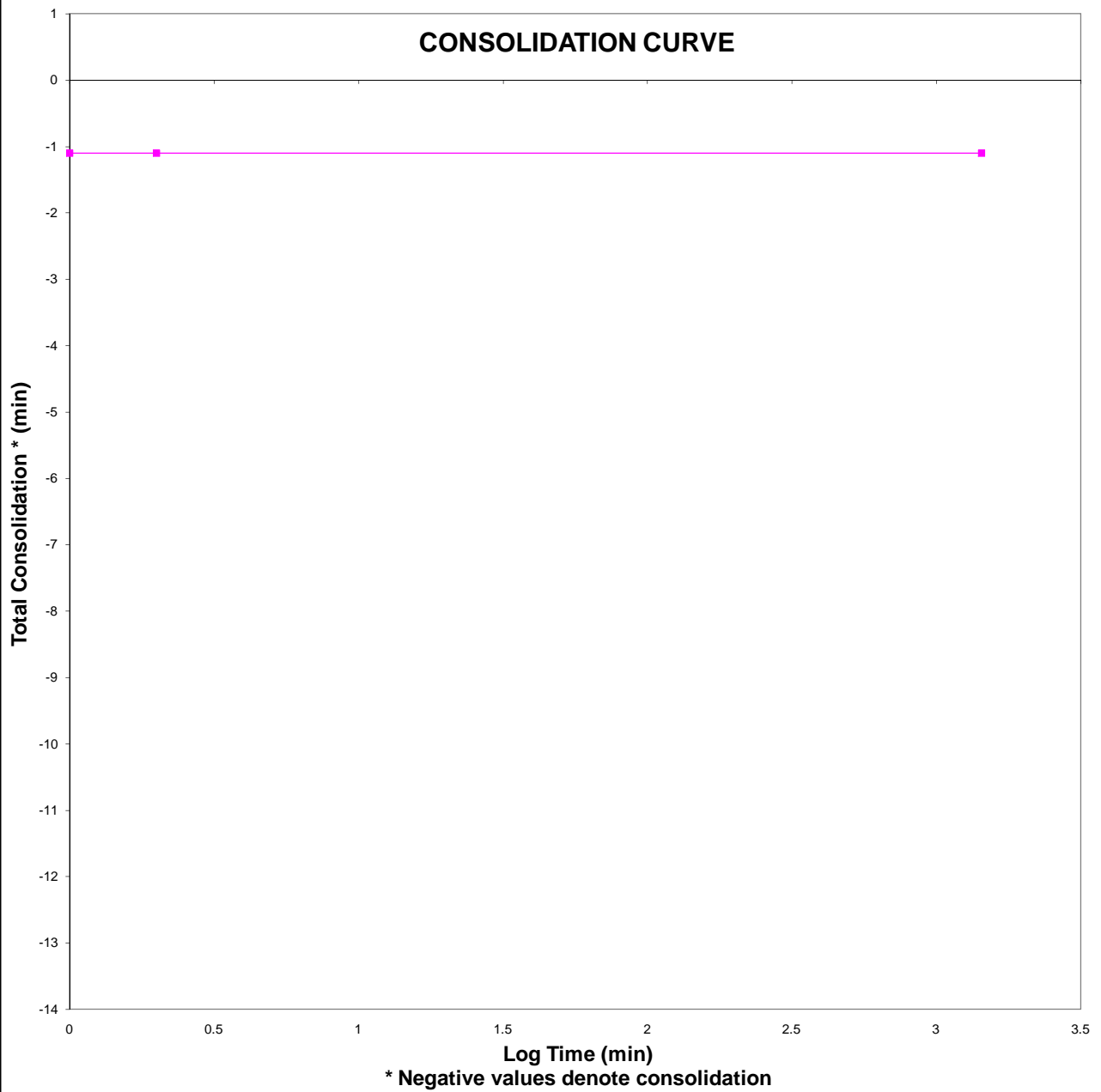
# PERMEABILITY ASTM D5084

## CONSOLIDATION CURVE

Page 4 of 6

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-026  
TEST DATE: 9/1/2009

TESTED BY: SEM  
TRACKING CODE: 6198\_PM  
EQUIPMENT No.: 6B



## PERMEABILITY ASTM D5084

## TEST DATA

Page 5 of 6

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-026
TEST DATE:	9/1/2009

TESTED BY:	SEM
TRACKING CODE:	6198_PM
EQUIPMENT No.:	6B

[illegible]

**TEST DATA (continued)**

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TESTED BY:	SEM
TRACKING CODE:	6198_PM
EQUIPMENT No.:	6B

[illegible]



# PERMEABILITY ASTM D5084

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-026  
TEST DATE: 9/1/2009

TESTED BY: SEM  
TRACKING CODE: 6198\_PM  
EQUIPMENT No.: 6B

TESTING PARAMETER	INITIAL	FINAL
BULK UNIT WEIGHT	112.3 lb/ft <sup>3</sup>	115.6 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	89.3 lb/ft <sup>3</sup>	89.9 lb/ft <sup>3</sup>
MOISTURE CONTENT	25.8 %	28.6 %
PERMEABILITY @ 20°C	1.3E-08 cm/sec	

# PERMEABILITY ASTM D5084

## SPECIMEN CONDITIONS

Page 1 of 6

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-027  
TEST DATE: 9/1/2009

TESTED BY: SEM  
TRACKING CODE: 6197\_PM  
EQUIPMENT No.: 6A

<b>MOISTURE CONTENT (Dry Basis)</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>1. MOISTURE TIN NO.</b>	0301-027	0301-027
<b>2. WT MOISTURE TIN (tare weight)</b>	0.00 g	232.57 g
<b>3. WT WET SOIL + TARE</b>	204.70 g	439.12 g
<b>4. WT DRY SOIL + TARE</b>	167.41 g	399.98 g
5. WT WATER, W <sub>w</sub>	37.29 g	39.14 g
6. WT DRY SOIL, W <sub>s</sub>	167.41 g	167.41 g
7. MOISTURE CONTENT, W	22.27 %	23.38 %

<b>SOIL SPECIMEN DIMENSIONS</b>				
<b>TRIPLICATE ANALYSES</b>	<b>DIAMETER</b>		<b>HEIGHT</b>	
	<b>INITIAL</b>	<b>FINAL</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>No. 1</b>	2.98 in.	2.94 in.	0.97 in.	0.96 in.
<b>No. 2</b>	2.98 in.	2.98 in.	0.96 in.	0.96 in.
<b>No. 3</b>	2.89 in.	2.99 in.	0.95 in.	0.96 in.
Average	2.95 in.	2.97 in.	0.96 in.	0.96 in.

<b>SPECIMEN CONDITIONS</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>Specimen WT, W<sub>o</sub></b>	<b>204.70 g</b>	<b>207.20 g</b>
Area, A <sub>o</sub>	6.83 in <sup>2</sup>	6.93 in <sup>2</sup>
Volume, V <sub>o</sub>	6.56 in <sup>3</sup>	6.65 in <sup>3</sup>
Bulk Unit Weight	118.8 lb/ft <sup>3</sup>	118.7 lb/ft <sup>3</sup>
Dry Unit Weight	97.2 lb/ft <sup>3</sup>	96.2 lb/ft <sup>3</sup>

## BACK-PRESSURE SATURATION

TESTED BY:	SEM
TRACKING CODE:	6197_PM
EQUIPMENT No.:	6A

\* Saturation check - no data available.

## SPECIMEN CONSOLIDATION

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-027
TEST DATE:	9/1/2009

SEM  
6197\_PM  
6A

[illegible]

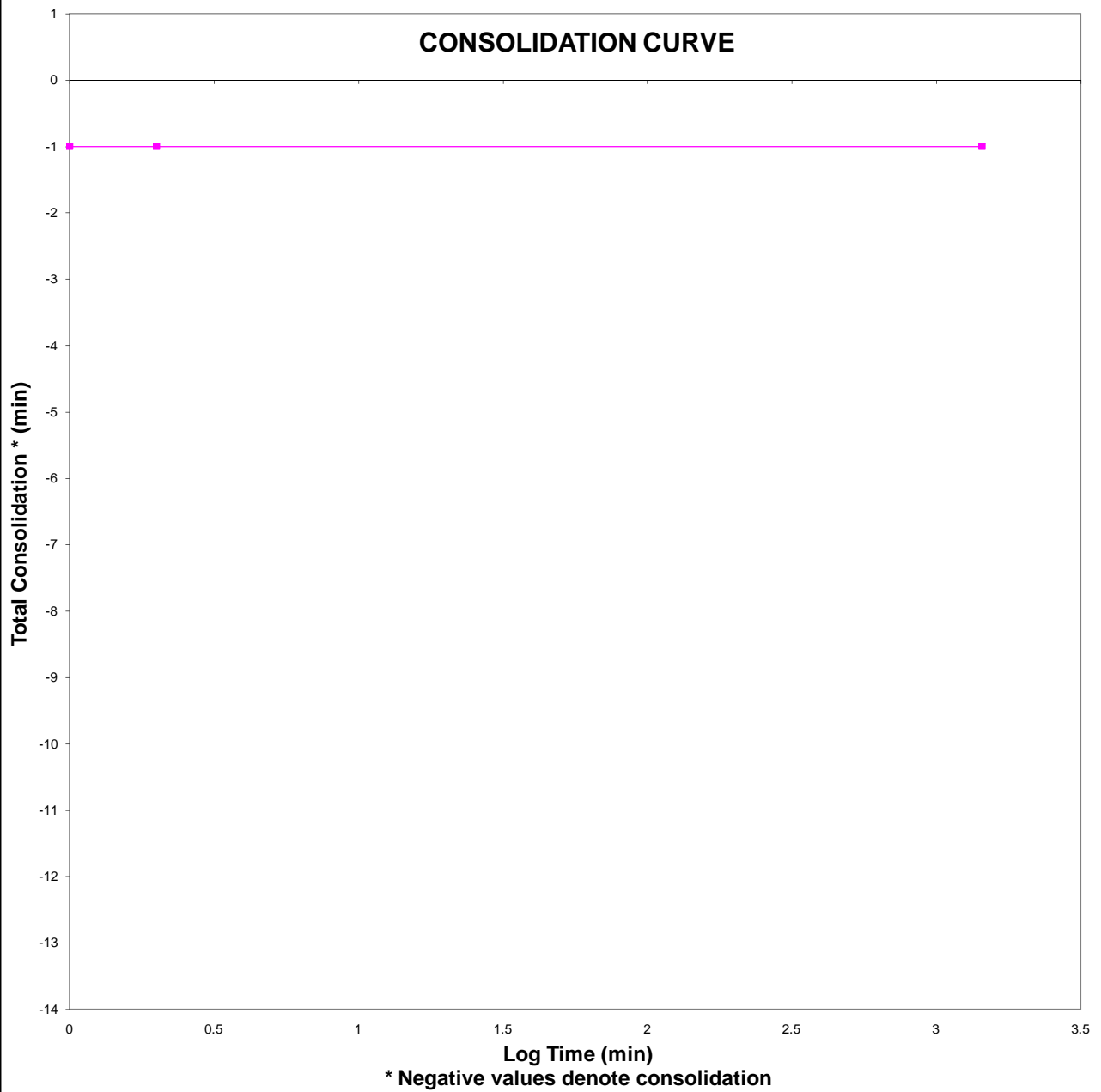
# PERMEABILITY ASTM D5084

## CONSOLIDATION CURVE

Page 4 of 6

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-027  
TEST DATE: 9/1/2009

TESTED BY: SEM  
TRACKING CODE: 6197\_PM  
EQUIPMENT No.: 6A



## PERMEABILITY ASTM D5084

## TEST DATA

Page 5 of 6

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-027
TEST DATE:	9/1/2009

TESTED BY:	SEM
TRACKING CODE:	6197_PM
EQUIPMENT No.:	6A

[illegible]

**TEST DATA (continued)**

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-027
TEST DATE:	9/1/2009

TESTED BY:	SEM
TRACKING CODE:	6197_PM
EQUIPMENT No.:	6A

[illegible]

# PERMEABILITY ASTM D5084

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-027  
TEST DATE: 9/1/2009

TESTED BY: SEM  
TRACKING CODE: 6197\_PM  
EQUIPMENT No.: 6A

TESTING PARAMETER	INITIAL	FINAL
BULK UNIT WEIGHT	118.8 lb/ft <sup>3</sup>	118.7 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	97.2 lb/ft <sup>3</sup>	96.2 lb/ft <sup>3</sup>
MOISTURE CONTENT	22.3 %	23.4 %
PERMEABILITY @ 20°C	5.1E-06 cm/sec	



# PERMEABILITY ASTM D5084

## SPECIMEN CONDITIONS

Page 1 of 6

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-028  
TEST DATE: 9/1/2009

TESTED BY: SEM  
TRACKING CODE: 6204\_PM  
EQUIPMENT No.: 7

<b>MOISTURE CONTENT (Dry Basis)</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>1. MOISTURE TIN NO.</b>	0301-028	0301-028
<b>2. WT MOISTURE TIN (tare weight)</b>	0.00 g	205.30 g
<b>3. WT WET SOIL + TARE</b>	246.70 g	454.02 g
<b>4. WT DRY SOIL + TARE</b>	199.61 g	404.91 g
5. WT WATER, W <sub>w</sub>	47.09 g	49.11 g
6. WT DRY SOIL, W <sub>s</sub>	199.61 g	199.61 g
7. MOISTURE CONTENT, W	23.59 %	24.60 %

<b>SOIL SPECIMEN DIMENSIONS</b>				
<b>TRIPLICATE ANALYSES</b>	<b>DIAMETER</b>		<b>HEIGHT</b>	
	<b>INITIAL</b>	<b>FINAL</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>No. 1</b>	2.98 in.	2.97 in.	1.08 in.	1.08 in.
<b>No. 2</b>	2.97 in.	2.97 in.	1.09 in.	1.09 in.
<b>No. 3</b>	2.92 in.	2.92 in.	1.10 in.	1.09 in.
Average	2.96 in.	2.95 in.	1.09 in.	1.09 in.

<b>SPECIMEN CONDITIONS</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>Specimen WT, W<sub>o</sub></b>	<b>246.70 g</b>	<b>248.87 g</b>
Area, A <sub>o</sub>	6.86 in <sup>2</sup>	6.85 in <sup>2</sup>
Volume, V <sub>o</sub>	7.48 in <sup>3</sup>	7.44 in <sup>3</sup>
Bulk Unit Weight	125.7 lb/ft <sup>3</sup>	127.4 lb/ft <sup>3</sup>
Dry Unit Weight	101.7 lb/ft <sup>3</sup>	102.2 lb/ft <sup>3</sup>

## BACK-PRESSURE SATURATION

TESTED BY:	SEM
TRACKING CODE:	6204_PM
EQUIPMENT No.:	7

\* Saturation check - no data available.

## SPECIMEN CONSOLIDATION

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-028
TEST DATE:	9/1/2009

SEM  
6204\_PM  
7

[illegible]

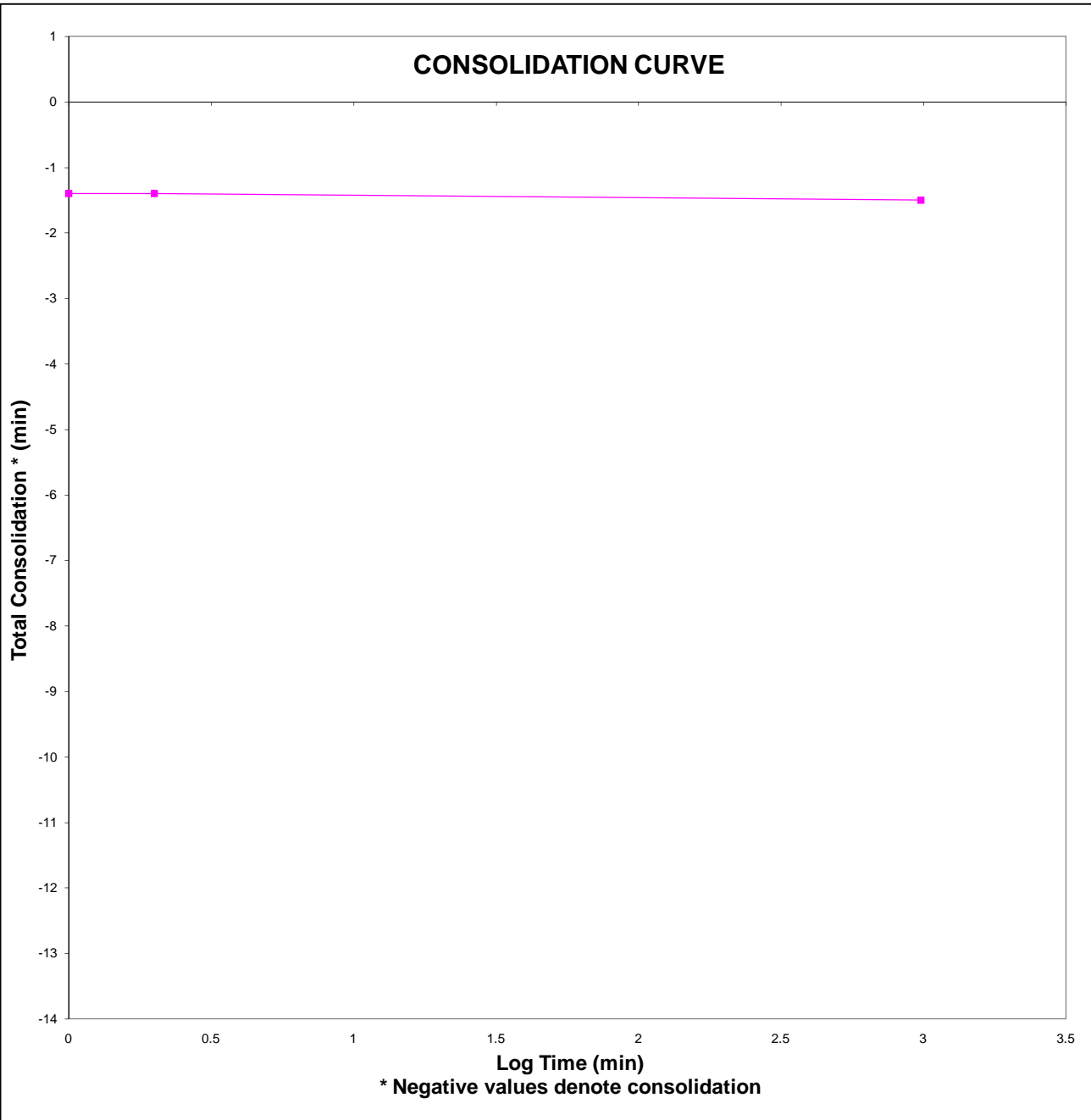
# PERMEABILITY ASTM D5084

## CONSOLIDATION CURVE

Page 4 of 6

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-028  
TEST DATE: 9/1/2009

TESTED BY: SEM  
TRACKING CODE: 6204\_PM  
EQUIPMENT No.: 7



## PERMEABILITY ASTM D5084

## TEST DATA

Page 5 of 6

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-028
TEST DATE:	9/1/2009

TESTED BY:	SEM
TRACKING CODE:	6204_PM
EQUIPMENT No.:	7

[illegible]

**TEST DATA (continued)**

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-028
TEST DATE:	9/1/2009

TESTED BY:	SEM
TRACKING CODE:	6204_PM
EQUIPMENT No.:	7

[illegible]

# PERMEABILITY ASTM D5084

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-028  
TEST DATE: 9/1/2009

TESTED BY: SEM  
TRACKING CODE: 6204\_PM  
EQUIPMENT No.: 7

TESTING PARAMETER	INITIAL	FINAL
BULK UNIT WEIGHT	125.7 lb/ft <sup>3</sup>	127.4 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	101.7 lb/ft <sup>3</sup>	102.2 lb/ft <sup>3</sup>
MOISTURE CONTENT	23.6 %	24.6 %
PERMEABILITY @ 20°C	5.4E-07 cm/sec	

# PERMEABILITY ASTM D5084

## SPECIMEN CONDITIONS

Page 1 of 6

PROJECT: Norwich MGP  
 PROJECT No.: SE-0301  
 SAMPLE No.: 0301-029  
 TEST DATE: 9/3/2009

TESTED BY: SEM  
 TRACKING CODE: 6205\_PM  
 EQUIPMENT No.: 7B

<b>MOISTURE CONTENT (Dry Basis)</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>1. MOISTURE TIN NO.</b>	0301-029	0301-029
<b>2. WT MOISTURE TIN (tare weight)</b>	0.00 g	256.10 g
<b>3. WT WET SOIL + TARE</b>	327.71 g	588.92 g
<b>4. WT DRY SOIL + TARE</b>	256.04 g	512.14 g
5. WT WATER, W <sub>w</sub>	71.67 g	76.78 g
6. WT DRY SOIL, W <sub>s</sub>	256.04 g	256.04 g
7. MOISTURE CONTENT, W	27.99 %	29.99 %

<b>SOIL SPECIMEN DIMENSIONS</b>				
<b>TRIPLICATE</b>	<b>DIAMETER</b>		<b>HEIGHT</b>	
<b>ANALYSES</b>	<b>INITIAL</b>	<b>FINAL</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>No. 1</b>	2.99 in.	2.99 in.	1.48 in.	1.48 in.
<b>No. 2</b>	3.02 in.	3.00 in.	1.48 in.	1.48 in.
<b>No. 3</b>	3.01 in.	3.01 in.	1.48 in.	1.47 in.
Average	3.01 in.	3.00 in.	1.48 in.	1.48 in.

<b>SPECIMEN CONDITIONS</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>Specimen WT, W<sub>o</sub></b>	<b>327.71 g</b>	<b>332.95 g</b>
Area, A <sub>o</sub>	7.10 in <sup>2</sup>	7.07 in <sup>2</sup>
Volume, V <sub>o</sub>	10.51 in <sup>3</sup>	10.44 in <sup>3</sup>
Bulk Unit Weight	118.8 lb/ft <sup>3</sup>	121.5 lb/ft <sup>3</sup>
Dry Unit Weight	92.8 lb/ft <sup>3</sup>	93.5 lb/ft <sup>3</sup>



## BACK-PRESSURE SATURATION

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-029
TEST DATE:	9/3/2009

[illegible]

\* Saturation check - no data available.

## SPECIMEN CONSOLIDATION

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-029
TEST DATE:	9/3/2009

SEM  
6205\_PM  
7B

[illegible]

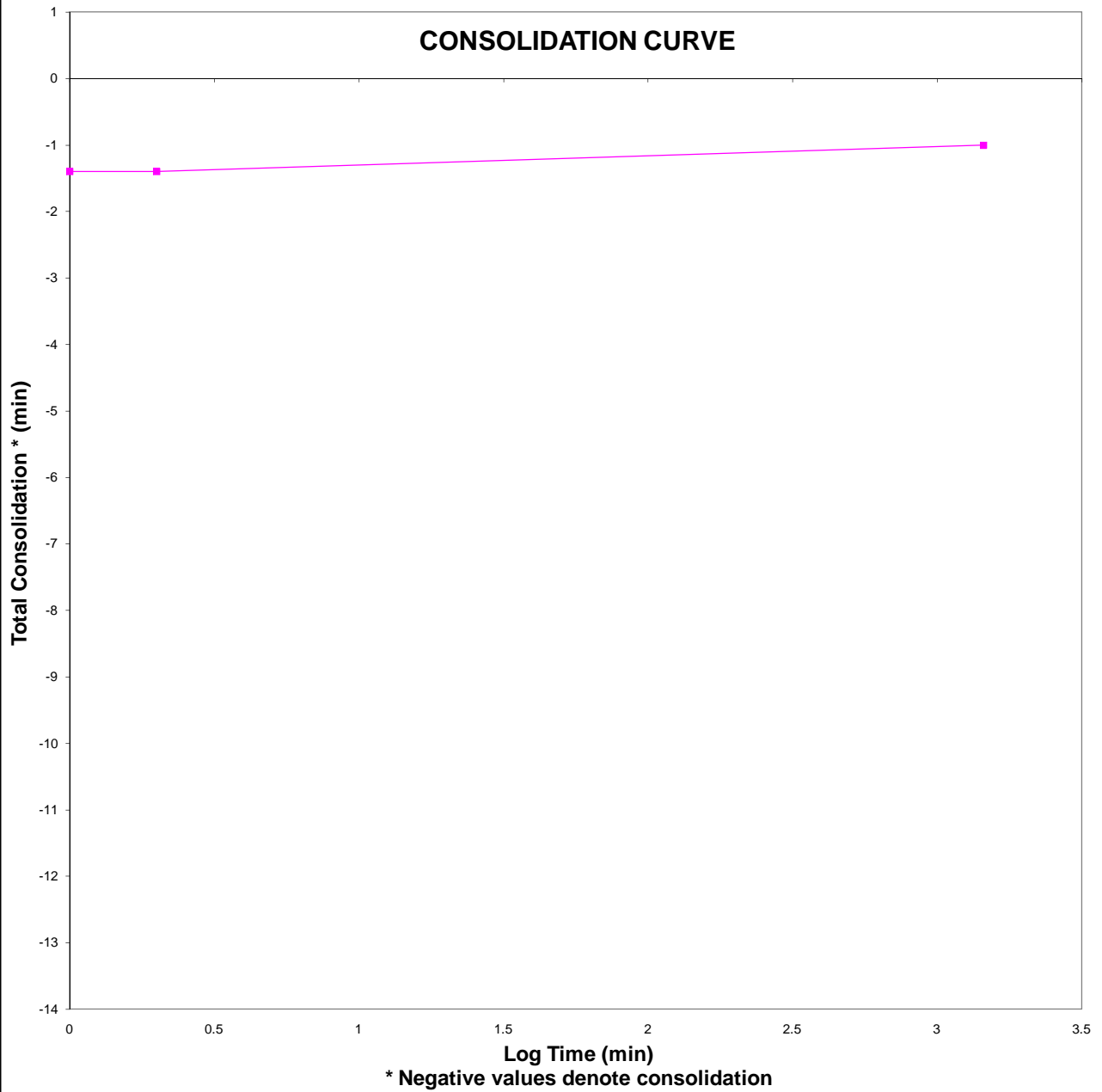
# PERMEABILITY ASTM D5084

## CONSOLIDATION CURVE

Page 4 of 6

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-029  
TEST DATE: 9/3/2009

TESTED BY: SEM  
TRACKING CODE: 6205\_PM  
EQUIPMENT No.: 7B



## PERMEABILITY ASTM D5084

## TEST DATA

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PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-029
TEST DATE:	9/3/2009

TESTED BY:	SEM
TRACKING CODE:	6205_PM
EQUIPMENT No.:	7B

[illegible]

**TEST DATA (continued)**

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-029
TEST DATE:	9/3/2009

TESTED BY:	SEM
TRACKING CODE:	6205_PM
EQUIPMENT No.:	7B

[illegible]

# PERMEABILITY ASTM D5084

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-029  
TEST DATE: 9/3/2009

TESTED BY: SEM  
TRACKING CODE: 6205\_PM  
EQUIPMENT No.: 7B

TESTING PARAMETER	INITIAL	FINAL
BULK UNIT WEIGHT	118.8 lb/ft <sup>3</sup>	121.5 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	92.8 lb/ft <sup>3</sup>	93.5 lb/ft <sup>3</sup>
MOISTURE CONTENT	28.0 %	30.0 %
PERMEABILITY @ 20°C	1.5E-06 cm/sec	

# PERMEABILITY ASTM D5084

## SPECIMEN CONDITIONS

Page 1 of 6

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-030  
TEST DATE: 9/3/2009

TESTED BY: SEM  
TRACKING CODE: 6206\_PM  
EQUIPMENT No.: 7A

<b>MOISTURE CONTENT (Dry Basis)</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>1. MOISTURE TIN NO.</b>	0301-030	0301-030
<b>2. WT MOISTURE TIN (tare weight)</b>	0.00 <b>g</b>	256.47 <b>g</b>
<b>3. WT WET SOIL + TARE</b>	349.50 <b>g</b>	610.60 <b>g</b>
<b>4. WT DRY SOIL + TARE</b>	274.22 <b>g</b>	530.69 <b>g</b>
5. WT WATER, W <sub>w</sub>	75.28 <b>g</b>	79.91 <b>g</b>
6. WT DRY SOIL, W <sub>s</sub>	274.22 <b>g</b>	274.22 <b>g</b>
7. MOISTURE CONTENT, W	27.45 <b>%</b>	29.14 <b>%</b>

<b>SOIL SPECIMEN DIMENSIONS</b>				
<b>TRIPLICATE ANALYSES</b>	<b>DIAMETER</b>		<b>HEIGHT</b>	
	<b>INITIAL</b>	<b>FINAL</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>No. 1</b>	2.99 in.	2.99 in.	1.57 in.	1.57 in.
<b>No. 2</b>	3.03 in.	3.01 in.	1.57 in.	1.57 in.
<b>No. 3</b>	3.01 in.	3.00 in.	1.56 in.	1.56 in.
Average	3.01 in.	3.00 in.	1.57 in.	1.57 in.

<b>SPECIMEN CONDITIONS</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>Specimen WT, W<sub>o</sub></b>	<b>349.50 g</b>	<b>354.25 g</b>
Area, A <sub>o</sub>	7.12 in <sup>2</sup>	7.07 in <sup>2</sup>
Volume, V <sub>o</sub>	11.15 in <sup>3</sup>	11.07 in <sup>3</sup>
Bulk Unit Weight	119.4 lb/ft <sup>3</sup>	121.9 lb/ft <sup>3</sup>
Dry Unit Weight	93.7 lb/ft <sup>3</sup>	94.4 lb/ft <sup>3</sup>

## BACK-PRESSURE SATURATION

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-030
TEST DATE:	9/3/2009

TESTED BY:	SEM
TRACKING CODE:	6206_PM
EQUIPMENT No.:	7A

[illegible]

\* Saturation check - no data available.



## SPECIMEN CONSOLIDATION

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-030
TEST DATE:	9/3/2009

SEM  
6206\_PM  
7A

[illegible]

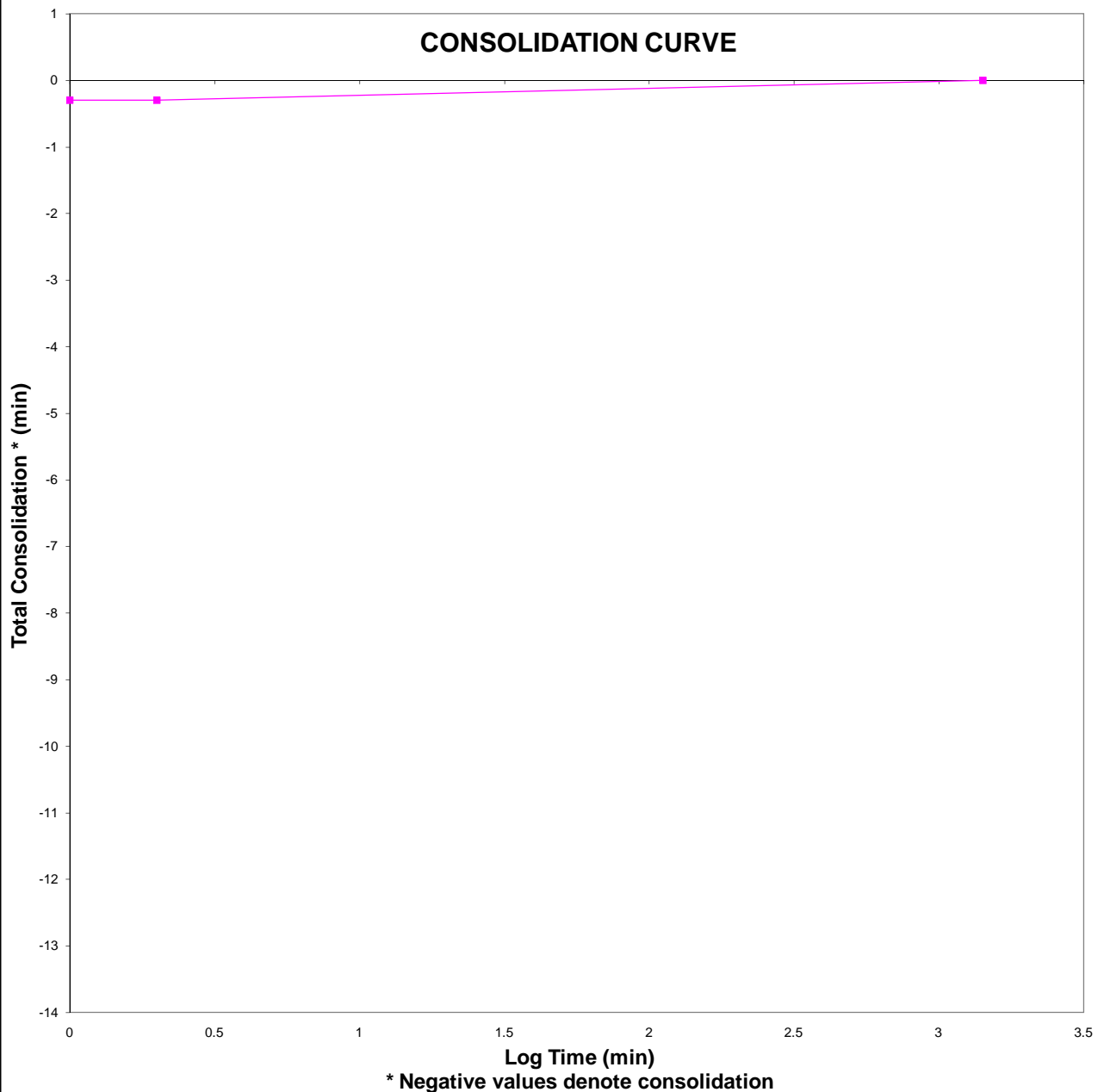
# PERMEABILITY ASTM D5084

## CONSOLIDATION CURVE

Page 4 of 6

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-030  
TEST DATE: 9/3/2009

TESTED BY: SEM  
TRACKING CODE: 6206\_PM  
EQUIPMENT No.: 7A



## PERMEABILITY ASTM D5084

## TEST DATA

Page 5 of 6

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-030
TEST DATE:	9/3/2009

TESTED BY:	SEM
TRACKING CODE:	6206_PM
EQUIPMENT No.:	7A

[illegible]

**TEST DATA (continued)**

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-030
TEST DATE:	9/3/2009

TESTED BY:	SEM
TRACKING CODE:	6206_PM
EQUIPMENT No.:	7A

[illegible]

# PERMEABILITY ASTM D5084

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-030  
TEST DATE: 9/3/2009

TESTED BY: SEM  
TRACKING CODE: 6206\_PM  
EQUIPMENT No.: 7A

TESTING PARAMETER	INITIAL	FINAL
BULK UNIT WEIGHT	119.4 lb/ft <sup>3</sup>	121.9 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	93.7 lb/ft <sup>3</sup>	94.4 lb/ft <sup>3</sup>
MOISTURE CONTENT	27.5 %	29.1 %
PERMEABILITY @ 20°C	5.8E-07 cm/sec	

# PERMEABILITY ASTM D5084

## SPECIMEN CONDITIONS

Page 1 of 6

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-031  
TEST DATE: 9/9/2009

TESTED BY: SEM  
TRACKING CODE: 6234\_PM  
EQUIPMENT No.: 1

<b>MOISTURE CONTENT (Dry Basis)</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>1. MOISTURE TIN NO.</b>	0301-031	0301-031
<b>2. WT MOISTURE TIN (tare weight)</b>	0.00 <b>g</b>	205.30 <b>g</b>
<b>3. WT WET SOIL + TARE</b>	204.58 <b>g</b>	413.90 <b>g</b>
<b>4. WT DRY SOIL + TARE</b>	162.85 <b>g</b>	368.15 <b>g</b>
5. WT WATER, W <sub>w</sub>	41.73 <b>g</b>	45.75 <b>g</b>
6. WT DRY SOIL, W <sub>s</sub>	162.85 <b>g</b>	162.85 <b>g</b>
7. MOISTURE CONTENT, W	25.62 <b>%</b>	28.09 <b>%</b>

<b>SOIL SPECIMEN DIMENSIONS</b>				
<b>TRIPLICATE ANALYSES</b>	<b>DIAMETER</b>		<b>HEIGHT</b>	
	<b>INITIAL</b>	<b>FINAL</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>No. 1</b>	2.00 in.	2.00 in.	1.99 in.	1.99 in.
<b>No. 2</b>	2.01 in.	2.01 in.	2.00 in.	2.00 in.
<b>No. 3</b>	2.02 in.	2.01 in.	2.01 in.	2.00 in.
Average	2.01 in.	2.01 in.	2.00 in.	2.00 in.

<b>SPECIMEN CONDITIONS</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>Specimen WT, W<sub>o</sub></b>	<b>204.58 g</b>	<b>208.65 g</b>
Area, A <sub>o</sub>	3.17 in <sup>2</sup>	3.16 in <sup>2</sup>
Volume, V <sub>o</sub>	6.35 in <sup>3</sup>	6.31 in <sup>3</sup>
Bulk Unit Weight	122.8 lb/ft <sup>3</sup>	125.9 lb/ft <sup>3</sup>
Dry Unit Weight	97.8 lb/ft <sup>3</sup>	98.3 lb/ft <sup>3</sup>

## BACK-PRESSURE SATURATION

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-031
TEST DATE:	9/9/2009

TESTED BY:	SEM
TRACKING CODE:	6234_PM
EQUIPMENT No.:	1

[illegible]

\* Saturation check - no data available.

## SPECIMEN CONSOLIDATION

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-031
TEST DATE:	9/9/2009

SEM  
6234\_PM  
1

[illegible]



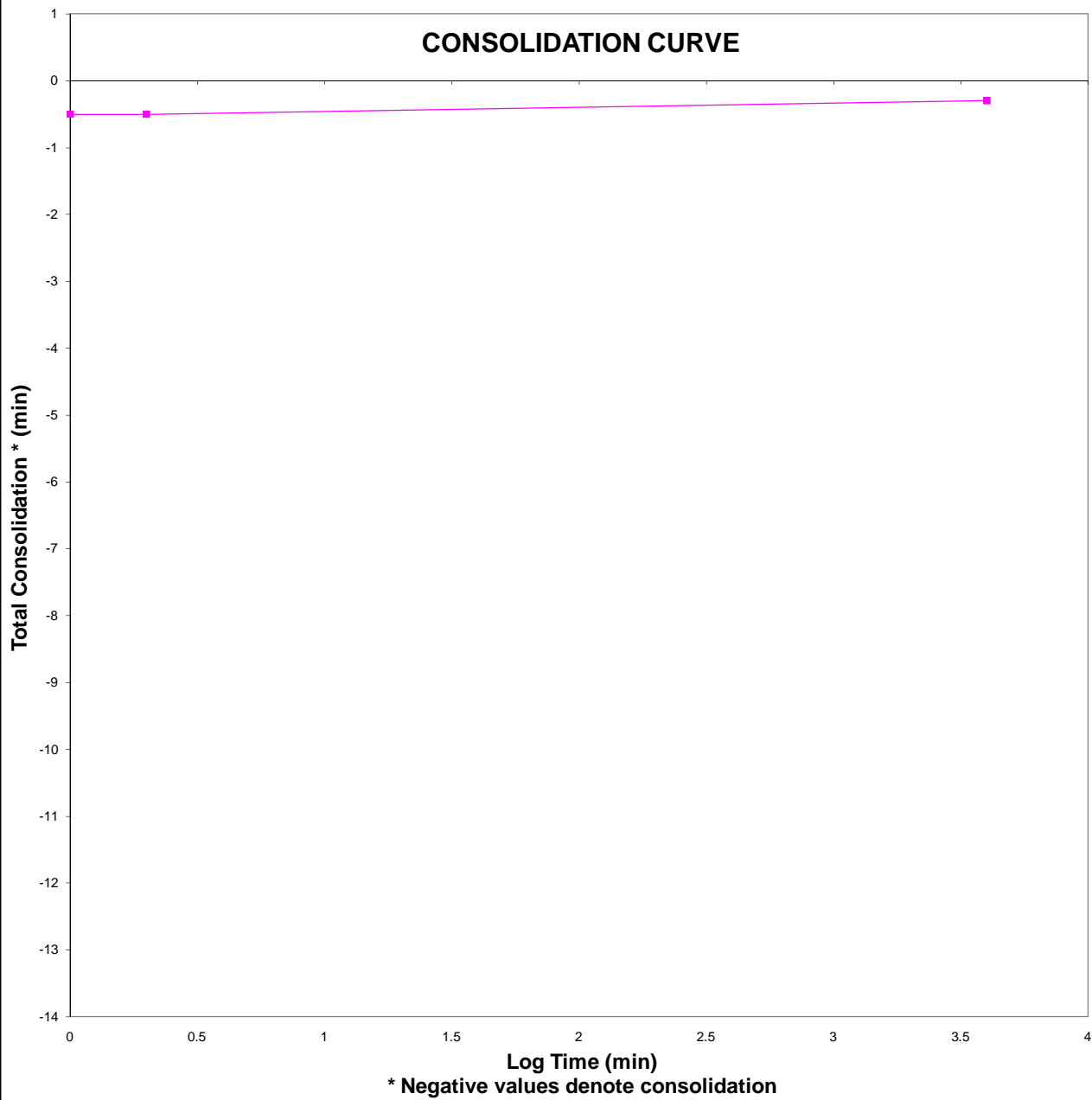
# PERMEABILITY ASTM D5084

## CONSOLIDATION CURVE

Page 4 of 6

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-031  
TEST DATE: 9/9/2009

TESTED BY: SEM  
TRACKING CODE: 6234\_PM  
EQUIPMENT No.: 1



## PERMEABILITY ASTM D5084

## TEST DATA

Page 5 of 6

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-031
TEST DATE:	9/9/2009

TESTED BY:	SEM
TRACKING CODE:	6234_PM
EQUIPMENT No.:	1

[illegible]

**TEST DATA (continued)**

Page 6 of 6

TESTED BY:	SEM
TRACKING CODE:	6234_PM
EQUIPMENT No.:	1

[illegible]

# PERMEABILITY ASTM D5084

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-031  
TEST DATE: 9/9/2009

TESTED BY: SEM  
TRACKING CODE: 6234\_PM  
EQUIPMENT No.: 1

TESTING PARAMETER	INITIAL	FINAL
BULK UNIT WEIGHT	122.8 lb/ft <sup>3</sup>	125.9 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	97.8 lb/ft <sup>3</sup>	98.3 lb/ft <sup>3</sup>
MOISTURE CONTENT	25.6 %	28.1 %
PERMEABILITY @ 20°C	3.7E-07 cm/sec	

# PERMEABILITY ASTM D5084

## SPECIMEN CONDITIONS

Page 1 of 6

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-032  
TEST DATE: 9/9/2009

TESTED BY: SEM  
TRACKING CODE: 6235\_PM  
EQUIPMENT No.: 2

<b>MOISTURE CONTENT (Dry Basis)</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>1. MOISTURE TIN NO.</b>	0301-032	0301-032
<b>2. WT MOISTURE TIN (tare weight)</b>	0.00 g	256.06 g
<b>3. WT WET SOIL + TARE</b>	209.22 g	468.91 g
<b>4. WT DRY SOIL + TARE</b>	165.27 g	421.33 g
5. WT WATER, W <sub>w</sub>	43.95 g	47.58 g
6. WT DRY SOIL, W <sub>s</sub>	165.27 g	165.27 g
7. MOISTURE CONTENT, W	26.59 %	28.79 %

<b>SOIL SPECIMEN DIMENSIONS</b>				
<b>TRIPLICATE ANALYSES</b>	<b>DIAMETER</b>		<b>HEIGHT</b>	
	<b>INITIAL</b>	<b>FINAL</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>No. 1</b>	2.01 in.	2.01 in.	2.05 in.	2.05 in.
<b>No. 2</b>	2.01 in.	2.01 in.	2.06 in.	2.06 in.
<b>No. 3</b>	2.02 in.	2.01 in.	2.07 in.	2.06 in.
Average	2.01 in.	2.01 in.	2.06 in.	2.06 in.

<b>SPECIMEN CONDITIONS</b>	<b>INITIAL</b>	<b>FINAL</b>
<b>Specimen WT, W<sub>o</sub></b>	<b>209.22 g</b>	<b>212.84 g</b>
Area, A <sub>o</sub>	3.18 in <sup>2</sup>	3.17 in <sup>2</sup>
Volume, V <sub>o</sub>	6.56 in <sup>3</sup>	6.53 in <sup>3</sup>
Bulk Unit Weight	121.5 lb/ft <sup>3</sup>	124.2 lb/ft <sup>3</sup>
Dry Unit Weight	96.0 lb/ft <sup>3</sup>	96.5 lb/ft <sup>3</sup>

## BACK-PRESSURE SATURATION

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-032
TEST DATE:	9/9/2009

[illegible]

\* Saturation check - no data available.

## SPECIMEN CONSOLIDATION

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-032
TEST DATE:	9/9/2009

$$\frac{\text{SEM}}{6235\_PM}$$
[illegible]

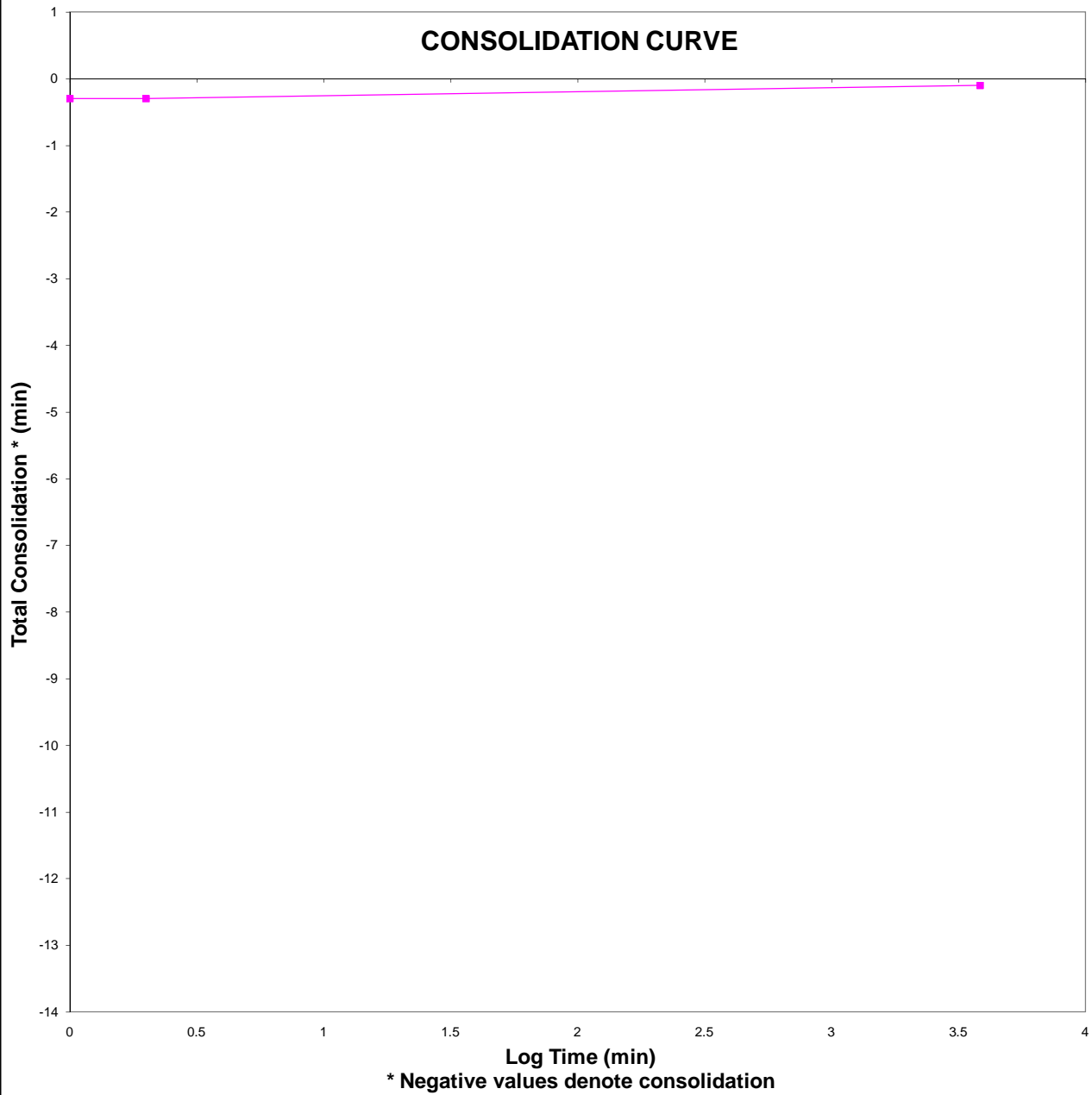
# PERMEABILITY ASTM D5084

## CONSOLIDATION CURVE

Page 4 of 6

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-032  
TEST DATE: 9/9/2009

TESTED BY: SEM  
TRACKING CODE: 6235\_PM  
EQUIPMENT No.: 2





## PERMEABILITY ASTM D5084

## TEST DATA

Page 5 of 6

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-032
TEST DATE:	9/9/2009

TESTED BY:	SEM
TRACKING CODE:	6235_PM
EQUIPMENT No.:	2

[illegible]

## PERMEABILITY ASTM D5084

### TEST DATA (continued)

Page 6 of 6

PROJECT:	Norwich MGP
PROJECT No.:	SE-0301
SAMPLE No.:	0301-032
TEST DATE:	9/9/2009

TESTED BY:	SEM
TRACKING CODE:	6235_PM
EQUIPMENT No.:	2

[illegible]

# PERMEABILITY ASTM D5084

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-032  
TEST DATE: 9/9/2009

TESTED BY: SEM  
TRACKING CODE: 6235\_PM  
EQUIPMENT No.: 2

TESTING PARAMETER	INITIAL	FINAL
BULK UNIT WEIGHT	121.5 lb/ft <sup>3</sup>	124.2 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	96.0 lb/ft <sup>3</sup>	96.5 lb/ft <sup>3</sup>
MOISTURE CONTENT	26.6 %	28.8 %
PERMEABILITY @ 20°C	8.3E-07 cm/sec	

**APPENDIX E**

**TREATED MATERIAL UNCONFINED**

**COMPRESSIVE STRENGTH TESTING**

# UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT: Norwich MGP  
 PROJECT No.: SE-0301  
 SAMPLE No.: 0301-001 (7-Day)  
 TESTING DATE: 8-May-09  
 TESTED BY: RSL

LOADING RATE: 0.04 in./min.  
 TRACKING CODE: 5808\_US

MOISTURE CONTENT (Dry Basis)	
1. MOISTURE TIN NO.	0301-001
2. WT MOISTURE TIN (tare weight)	84.83 g
3. WT WET SOIL + TARE	137.83 g
4. WT DRY SOIL + TARE	128.19 g
5. WT WATER, Ww	9.64 g
6. WT DRY SOIL, Ws	43.36 g
7. MOISTURE CONTENT, W	22.23 %

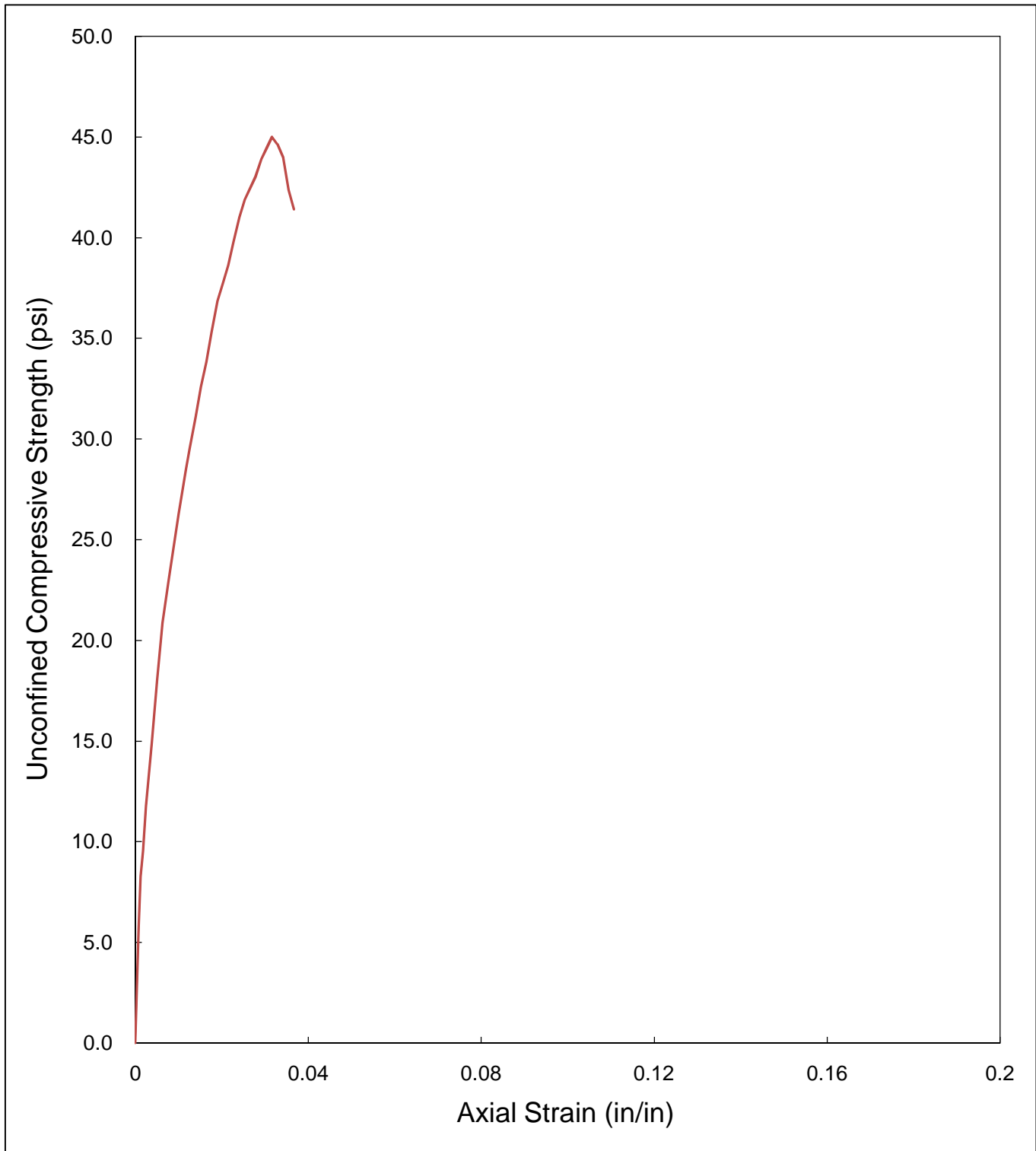
SOIL SPECIMEN DIMENSIONS		
	DIAMETER	LENGTH
No. 1	2.00 in.	3.96 in.
No. 2	2.00 in.	3.96 in.
No. 3	2.00 in.	3.96 in.
Average	2.00 in.	3.96 in.

SPECIMEN CONDITIONS	
Initial Specimen WT, Wo	401.30 g
Initial Area, Ao	3.14 in <sup>2</sup>
Initial Volume, Vo	12.44 in <sup>3</sup>
Initial Bulk Unit Weight,	122.9 lb/ft <sup>3</sup>
Initial Dry Unit Weight	100.5 lb/ft <sup>3</sup>
15 % Strain (0.15 Lo)	0.59 in.
UCS	45.0 lb/in <sup>2</sup>

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in <sup>2</sup> )	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in <sup>2</sup> )
0	0.000	0.000	3.142	0.0000	0.0
18	0.003	0.003	3.144	0.0008	5.7
26	0.005	0.005	3.146	0.0013	8.3
30	0.007	0.007	3.147	0.0018	9.5
37	0.010	0.010	3.150	0.0025	11.7
47	0.015	0.015	3.154	0.0038	14.9
57	0.020	0.020	3.158	0.0051	18.1
66	0.025	0.025	3.162	0.0063	20.9
72	0.030	0.030	3.166	0.0076	22.7
78	0.035	0.035	3.170	0.0088	24.6
84	0.040	0.040	3.174	0.0101	26.5
89	0.045	0.045	3.178	0.0114	28.0
94	0.050	0.050	3.182	0.0126	29.5
99	0.055	0.055	3.186	0.0139	31.1
104	0.060	0.060	3.190	0.0152	32.6
108	0.065	0.065	3.194	0.0164	33.8
113	0.070	0.070	3.198	0.0177	35.3
118	0.075	0.075	3.202	0.0189	36.8
121	0.080	0.080	3.206	0.0202	37.7
124	0.085	0.085	3.211	0.0215	38.6
128	0.090	0.090	3.215	0.0227	39.8
132	0.095	0.095	3.219	0.0240	41.0
135	0.100	0.100	3.223	0.0253	41.9
139	0.110	0.110	3.231	0.0278	43.0
142	0.115	0.115	3.236	0.0290	43.9
144	0.120	0.120	3.240	0.0303	44.4
146	0.125	0.125	3.244	0.0316	45.0
145	0.130	0.130	3.248	0.0328	44.6
143	0.135	0.135	3.252	0.0341	44.0
138	0.140	0.140	3.257	0.0354	42.4
135	0.145	0.145	3.261	0.0366	41.4

# UNCONFINED COMPRESSION TESTING

Sample No. 0301-001 (7-Day)



# UNCONFINED COMPRESSION TEST

ASTM D 2166

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-001 (7-Day)  
TESTING DATE: 5/8/2009  
TESTED BY: RSL

LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5808\_US

TESTING PARAMETER AND RESULTS	
MOISTURE CONTENT	22.2 %
BULK UNIT WEIGHT	122.9 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	100.5 lb/ft <sup>3</sup>
UCS *	45.0 lb/in <sup>2</sup>

\* UCS - UNCONFINED COMPRESSIVE STRENGTH

# UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT: Norwich MGP  
 PROJECT No.: SE-0301  
 SAMPLE No.: 0301-001 (14-Day)  
 TESTING DATE: 15-May-09  
 TESTED BY: SEM

LOADING RATE: 0.04 in./min.  
 TRACKING CODE: 5830\_US

MOISTURE CONTENT (Dry Basis)	
1. MOISTURE TIN NO.	0301-001
2. WT MOISTURE TIN (tare weight)	67.05 g
3. WT WET SOIL + TARE	193.69 g
4. WT DRY SOIL + TARE	170.70 g
5. WT WATER, Ww	22.99 g
6. WT DRY SOIL, Ws	103.65 g
7. MOISTURE CONTENT, W	22.18 %

SOIL SPECIMEN DIMENSIONS		
	DIAMETER	LENGTH
No. 1	1.99 in.	3.97 in.
No. 2	1.99 in.	3.97 in.
No. 3	1.99 in.	3.97 in.
Average	1.99 in.	3.97 in.

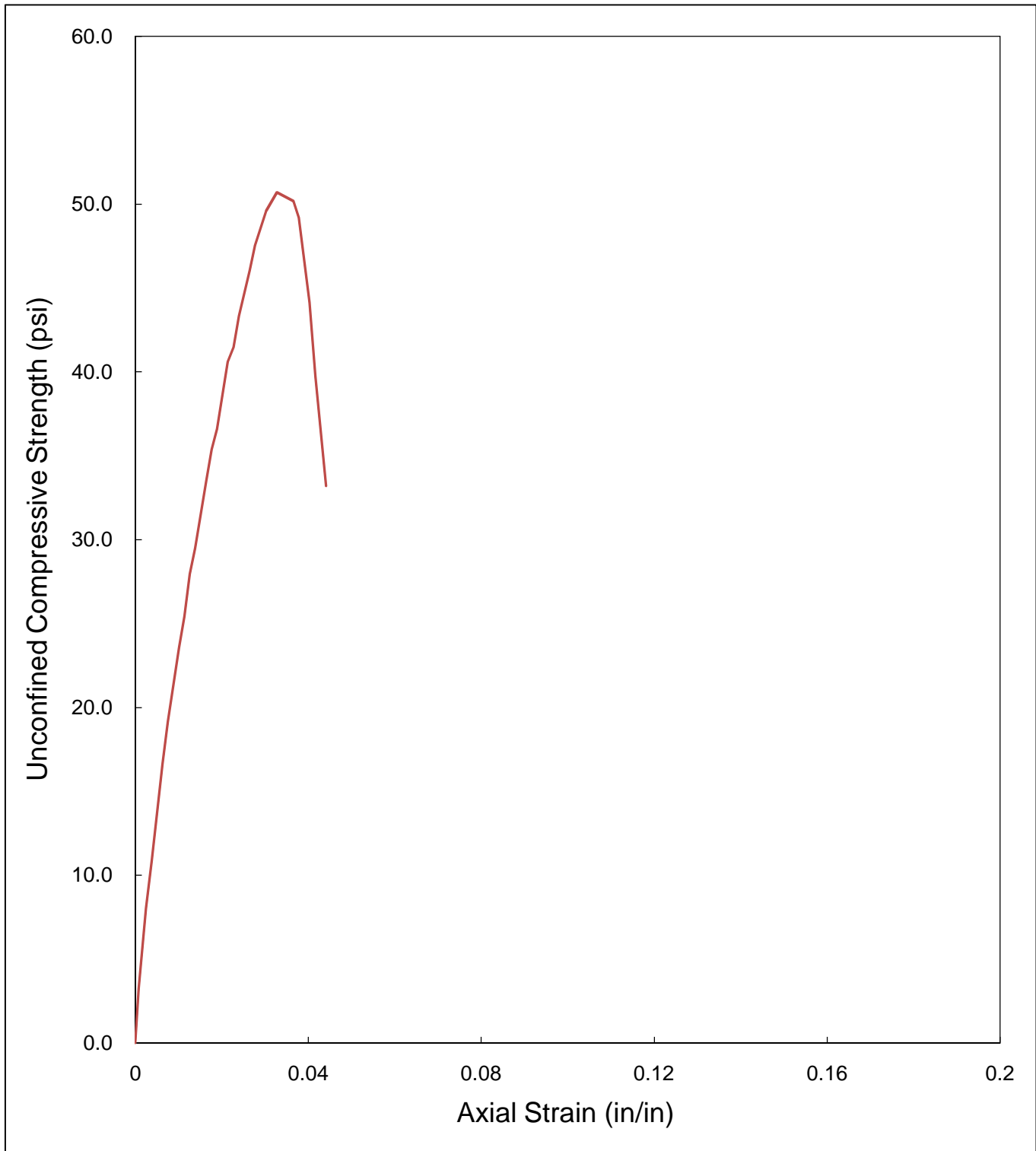
SPECIMEN CONDITIONS	
Initial Specimen WT, Wo	396.50 g
Initial Area, Ao	3.11 in <sup>2</sup>
Initial Volume, Vo	12.35 in <sup>3</sup>
Initial Bulk Unit Weight,	122.3 lb/ft <sup>3</sup>
Initial Dry Unit Weight	100.1 lb/ft <sup>3</sup>
15 % Strain (0.15 Lo)	0.60 in.
UCS	50.7 lb/in <sup>2</sup>

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in <sup>2</sup> )	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in <sup>2</sup> )
0	0.000	0.000	3.110	0.0000	0.0
10	0.003	0.003	3.113	0.0008	3.2
14	0.005	0.005	3.114	0.0013	4.5
25	0.010	0.010	3.118	0.0025	8.0
34	0.015	0.015	3.122	0.0038	10.9
52	0.025	0.025	3.130	0.0063	16.6
60	0.030	0.030	3.134	0.0076	19.1
74	0.040	0.040	3.142	0.0101	23.6
80	0.045	0.045	3.146	0.0113	25.4
88	0.050	0.050	3.150	0.0126	27.9
93	0.055	0.055	3.154	0.0139	29.5
106	0.065	0.065	3.162	0.0164	33.5
112	0.070	0.070	3.166	0.0176	35.4
116	0.075	0.075	3.170	0.0189	36.6
129	0.085	0.085	3.178	0.0214	40.6
132	0.090	0.090	3.182	0.0227	41.5
138	0.095	0.095	3.187	0.0239	43.3
147	0.105	0.105	3.195	0.0264	46.0
152	0.110	0.110	3.199	0.0277	47.5
159	0.120	0.120	3.207	0.0302	49.6
161	0.125	0.125	3.211	0.0315	50.1
163	0.130	0.130	3.216	0.0327	50.7
162	0.145	0.145	3.228	0.0365	50.2
159	0.150	0.150	3.232	0.0378	49.2
143	0.160	0.160	3.241	0.0403	44.1
129	0.165	0.165	3.245	0.0416	39.8
108	0.175	0.175	3.254	0.0441	33.2



# UNCONFINED COMPRESSION TESTING

Sample No. 0301-001 (14-Day)



# UNCONFINED COMPRESSION TEST

ASTM D 2166

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-001 (14-Day)  
TESTING DATE: 5/15/2009  
TESTED BY: SEM

LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5830\_US

TESTING PARAMETER AND RESULTS	
MOISTURE CONTENT	22.2 %
BULK UNIT WEIGHT	122.3 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	100.1 lb/ft <sup>3</sup>
UCS *	50.7 lb/in <sup>2</sup>

\* UCS - UNCONFINED COMPRESSIVE STRENGTH

# UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT: Norwich MGP  
 PROJECT No.: SE-0301  
 SAMPLE No.: 0301-001 (28 day)  
 TESTING DATE: 28-May-09  
 TESTED BY: SEM/MP

LOADING RATE: 0.04 in./min.  
 TRACKING CODE: 5879\_US

MOISTURE CONTENT (Dry Basis)	
1. MOISTURE TIN NO.	0301-001
2. WT MOISTURE TIN (tare weight)	69.39 g
3. WT WET SOIL + TARE	170.06 g
4. WT DRY SOIL + TARE	151.81 g
5. WT WATER, W <sub>w</sub>	18.25 g
6. WT DRY SOIL, W <sub>s</sub>	82.42 g
7. MOISTURE CONTENT, W	22.14 %

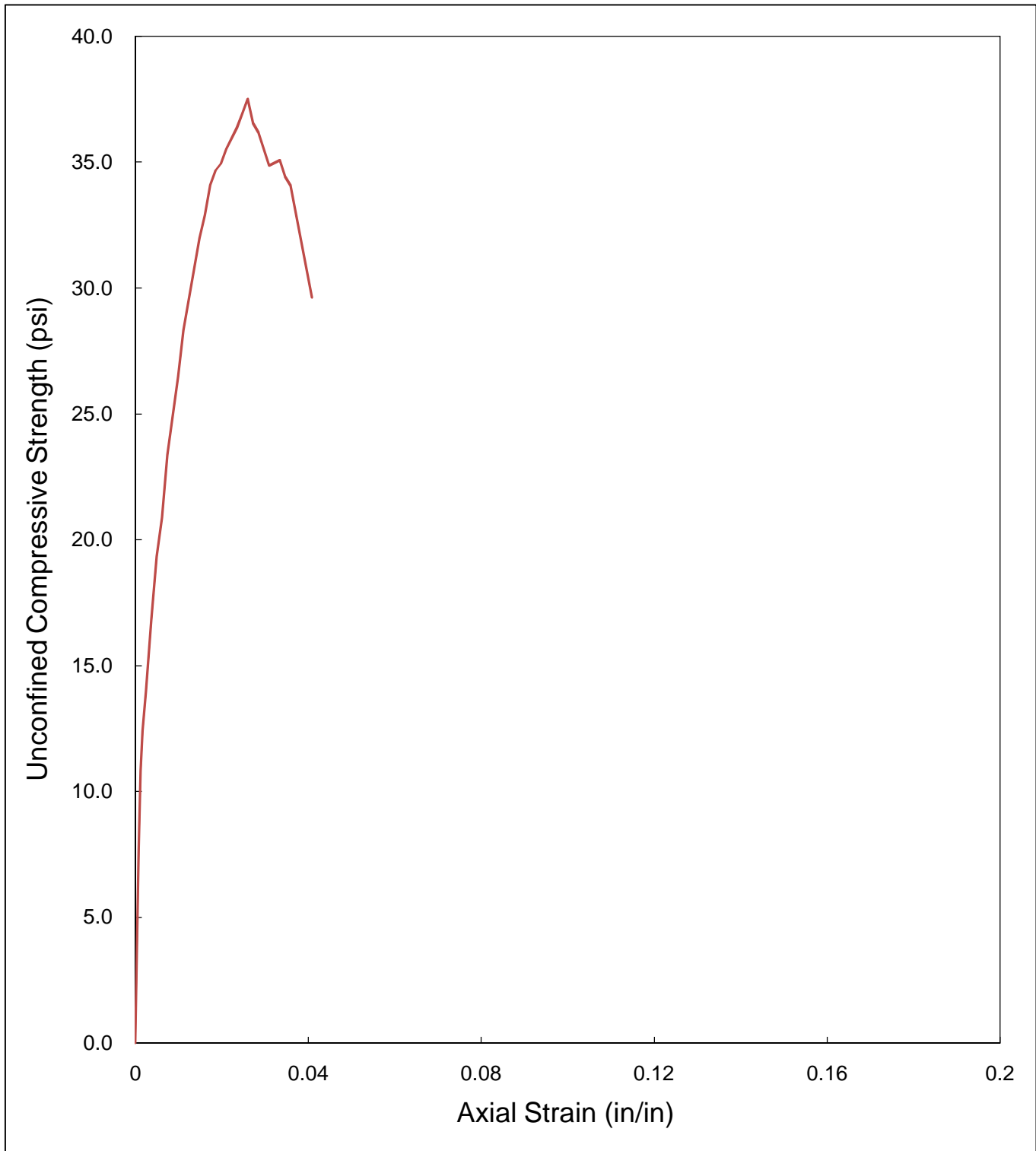
SOIL SPECIMEN DIMENSIONS		
	DIAMETER	LENGTH
No. 1	2.00 in.	4.05 in.
No. 2	2.00 in.	4.04 in.
No. 3	2.00 in.	4.04 in.
Average	2.00 in.	4.04 in.

SPECIMEN CONDITIONS	
Initial Specimen WT, W <sub>o</sub>	398.36 g
Initial Area, A <sub>o</sub>	3.14 in <sup>2</sup>
Initial Volume, V <sub>o</sub>	12.70 in <sup>3</sup>
Initial Bulk Unit Weight,	119.5 lb/ft <sup>3</sup>
Initial Dry Unit Weight	97.8 lb/ft <sup>3</sup>
15 % Strain (0.15 L <sub>o</sub> )	0.61 in.
UCS	37.5 lb/in <sup>2</sup>

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in <sup>2</sup> )	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in <sup>2</sup> )
0	0.000	0.000	3.142	0.0000	0.0
24	0.003	0.003	3.144	0.0007	7.6
34	0.005	0.005	3.145	0.0012	10.8
39	0.007	0.007	3.147	0.0017	12.4
44	0.010	0.010	3.149	0.0025	14.0
53	0.015	0.015	3.153	0.0037	16.8
61	0.020	0.020	3.157	0.0049	19.3
66	0.025	0.025	3.161	0.0062	20.9
74	0.030	0.030	3.165	0.0074	23.4
79	0.035	0.035	3.169	0.0087	24.9
84	0.040	0.040	3.173	0.0099	26.5
90	0.045	0.045	3.177	0.0111	28.3
94	0.050	0.050	3.181	0.0124	29.6
98	0.055	0.055	3.185	0.0136	30.8
102	0.060	0.060	3.189	0.0148	32.0
105	0.065	0.065	3.193	0.0161	32.9
109	0.070	0.070	3.197	0.0173	34.1
111	0.075	0.075	3.201	0.0185	34.7
112	0.080	0.080	3.205	0.0198	34.9
114	0.085	0.085	3.209	0.0210	35.5
117	0.095	0.095	3.217	0.0235	36.4
119	0.100	0.100	3.221	0.0247	36.9
121	0.105	0.105	3.225	0.0260	37.5
118	0.110	0.110	3.229	0.0272	36.5
117	0.115	0.115	3.234	0.0284	36.2
115	0.120	0.120	3.238	0.0297	35.5
113	0.125	0.125	3.242	0.0309	34.9
114	0.135	0.135	3.250	0.0334	35.1
112	0.140	0.140	3.254	0.0346	34.4
111	0.145	0.145	3.258	0.0359	34.1
97	0.165	0.165	3.275	0.0408	29.6

# UNCONFINED COMPRESSION TESTING

Sample No. 0301-001 (28 day)



# UNCONFINED COMPRESSION TEST

ASTM D 2166

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-001 (28 day)  
TESTING DATE: 5/28/2009  
TESTED BY: SEM/MP

LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5879\_US

TESTING PARAMETER AND RESULTS	
MOISTURE CONTENT	22.1 %
BULK UNIT WEIGHT	119.5 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	97.8 lb/ft <sup>3</sup>
UCS *	37.5 lb/in <sup>2</sup>

\* UCS - UNCONFINED COMPRESSIVE STRENGTH

## ASTM D 2166

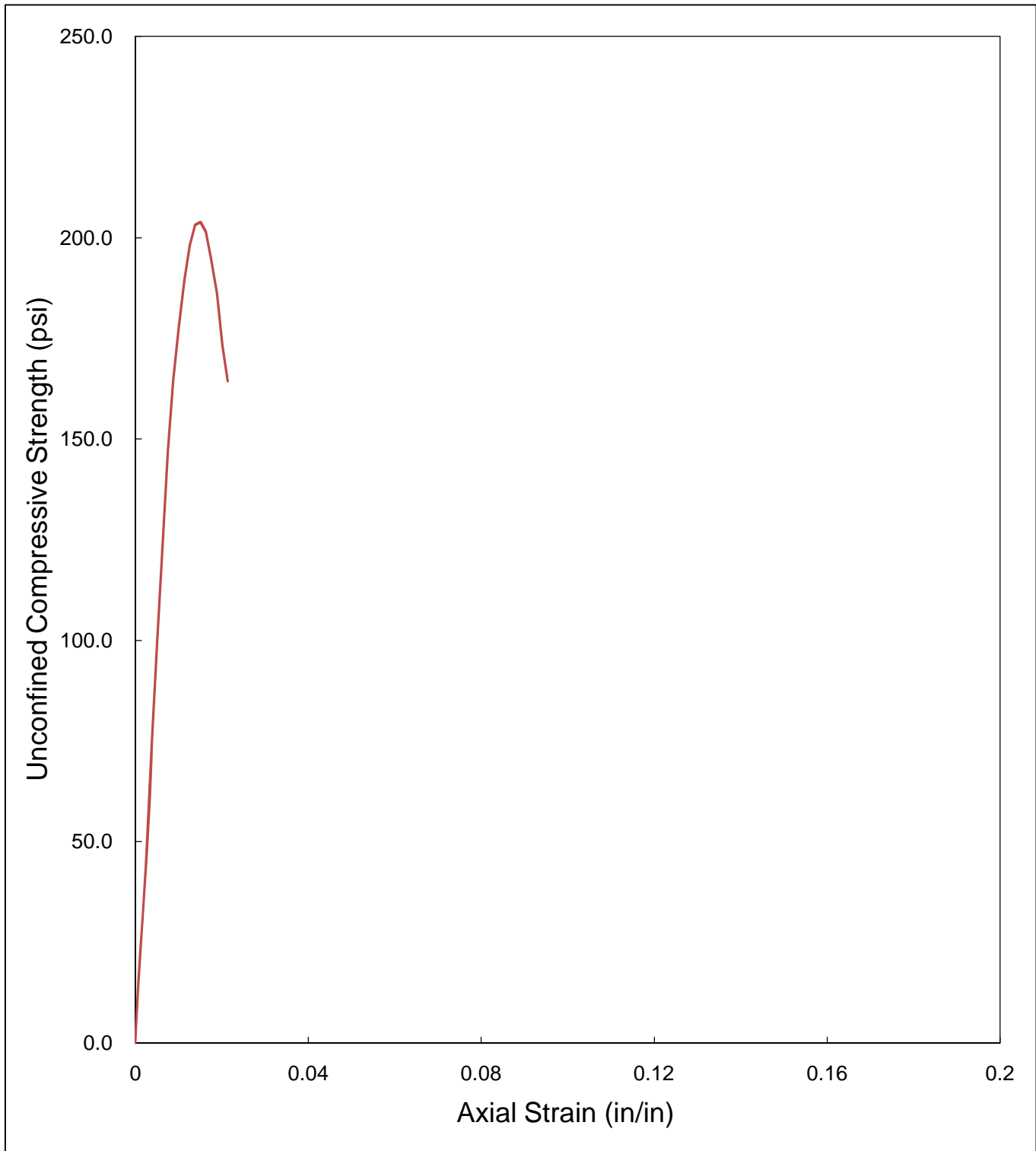
LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5809\_US

<b>SOIL SPECIMEN DIMENSIONS</b>		
	<b>DIAMETER</b>	<b>LENGTH</b>
No. 1	1.99 in.	3.98 in.
No. 2	2.00 in.	3.98 in.
No. 3	1.99 in.	3.97 in.
<b>Average</b>	<b>1.99 in.</b>	<b>3.98 in.</b>

[illegible]

# UNCONFINED COMPRESSION TESTING

Sample No. 0301-002 (7-Day)



# UNCONFINED COMPRESSION TEST

ASTM D 2166

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-002 (7-Day)  
TESTING DATE: 5/8/2009  
TESTED BY: RSL

LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5809\_US

TESTING PARAMETER AND RESULTS	
MOISTURE CONTENT	22.7 %
BULK UNIT WEIGHT	124.0 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	101.0 lb/ft <sup>3</sup>
UCS *	203.9 lb/in <sup>2</sup>

\* UCS - UNCONFINED COMPRESSIVE STRENGTH



## ASTM D 2166

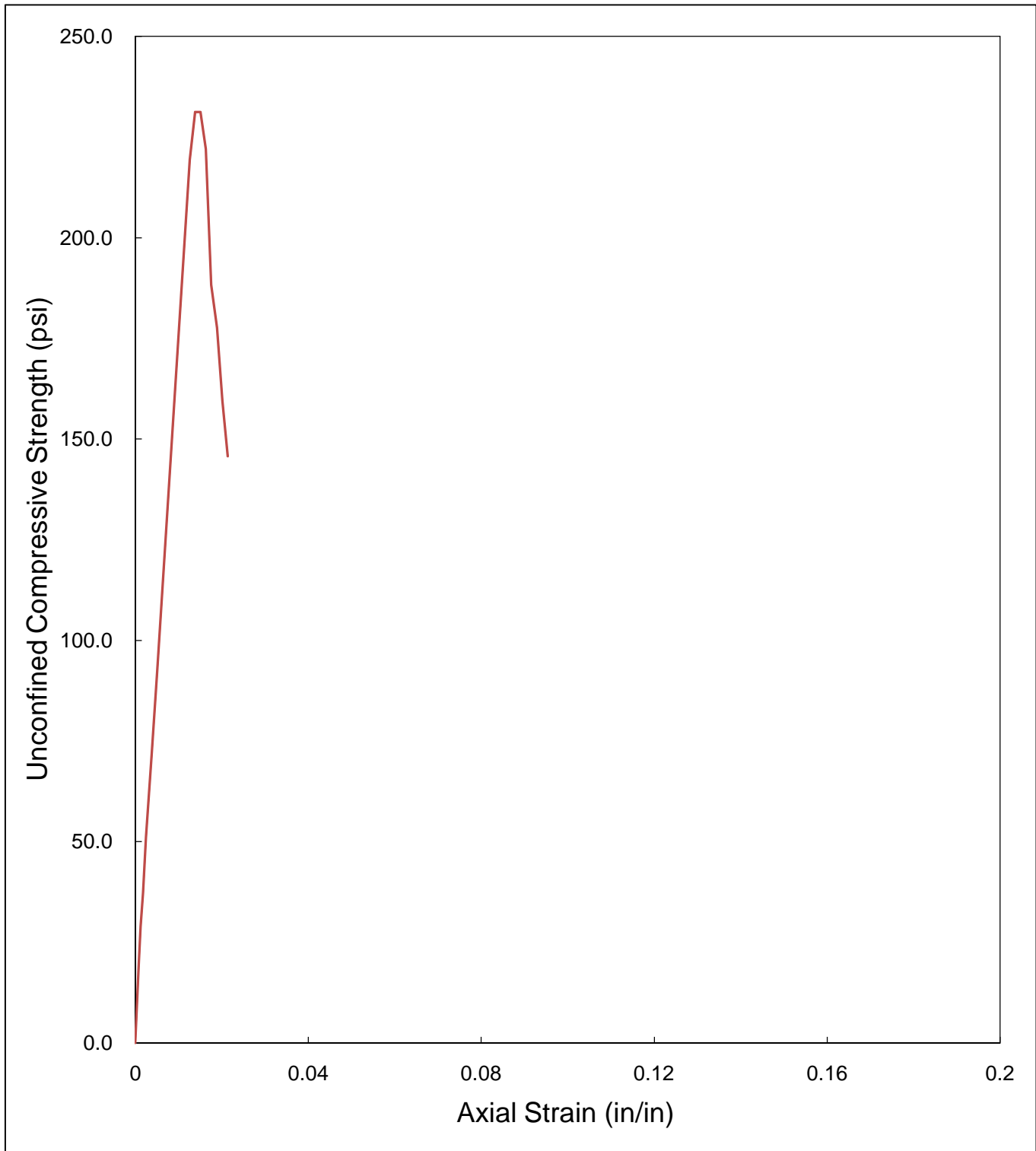
LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5831\_US

SOIL SPECIMEN DIMENSIONS		
	DIAMETER	LENGTH
No. 1	1.99 in.	3.99 in.
No. 2	1.99 in.	3.97 in.
No. 3	1.99 in.	3.98 in.
<b>Average</b>	<b>1.99 in.</b>	<b>3.98 in.</b>

[illegible]

# UNCONFINED COMPRESSION TESTING

Sample No. 0301-002 (14-Day)



# UNCONFINED COMPRESSION TEST

ASTM D 2166

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-002 (14-Day)  
TESTING DATE: 5/15/2009  
TESTED BY: RSL

LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5831\_US

TESTING PARAMETER AND RESULTS	
MOISTURE CONTENT	21.5 %
BULK UNIT WEIGHT	123.8 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	101.9 lb/ft <sup>3</sup>
UCS *	231.2 lb/in <sup>2</sup>

\* UCS - UNCONFINED COMPRESSIVE STRENGTH

# UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT: Norwich MGP  
 PROJECT No.: SE-0301  
 SAMPLE No.: 0301-002 (28 day)  
 TESTING DATE: 28-May-09  
 TESTED BY: SEM/MP

LOADING RATE: 0.04 in./min.  
 TRACKING CODE: 5880 US

MOISTURE CONTENT (Dry Basis)	
1. MOISTURE TIN NO.	0301-002
2. WT MOISTURE TIN (tare weight)	70.72 g
3. WT WET SOIL + TARE	190.49 g
4. WT DRY SOIL + TARE	169.59 g
5. WT WATER, Ww	20.90 g
6. WT DRY SOIL, Ws	98.87 g
7. MOISTURE CONTENT, W	21.14 %

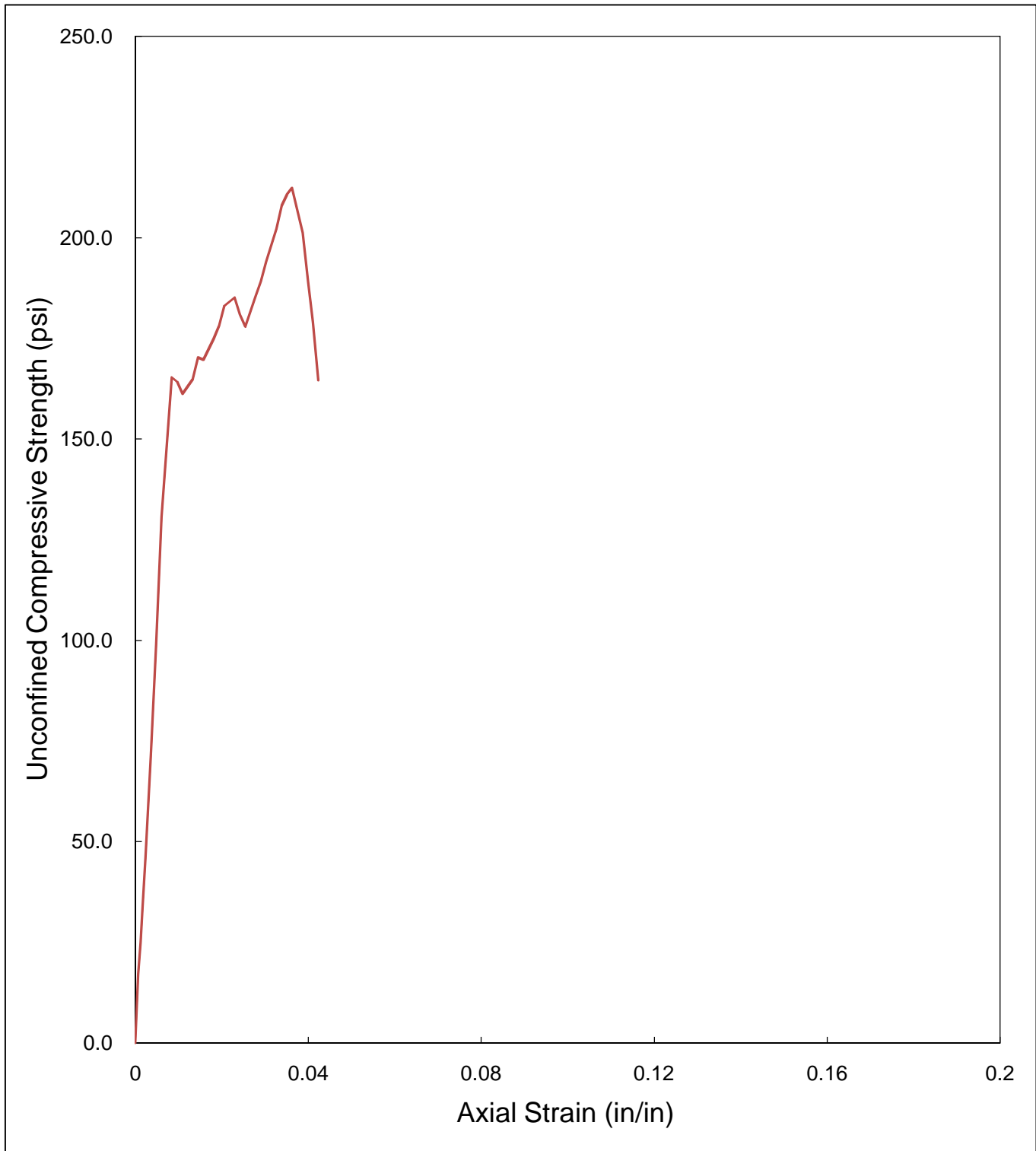
SOIL SPECIMEN DIMENSIONS		
	DIAMETER	LENGTH
No. 1	2.00 in.	4.14 in.
No. 2	2.01 in.	4.13 in.
No. 3	2.02 in.	4.13 in.
Average	2.01 in.	4.13 in.

SPECIMEN CONDITIONS	
Initial Specimen WT, Wo	414.32 g
Initial Area, Ao	3.17 in <sup>2</sup>
Initial Volume, Vo	13.12 in <sup>3</sup>
Initial Bulk Unit Weight,	120.3 lb/ft <sup>3</sup>
Initial Dry Unit Weight	99.3 lb/ft <sup>3</sup>
15 % Strain (0.15 Lo)	0.62 in.
UCS	212.3 lb/in <sup>2</sup>

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in <sup>2</sup> )	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in <sup>2</sup> )
0	0.000	0.000	3.173	0.0000	0.0
54	0.003	0.003	3.175	0.0007	17.0
79	0.005	0.005	3.177	0.0012	24.9
107	0.007	0.007	3.178	0.0017	33.7
146	0.010	0.010	3.181	0.0024	45.9
227	0.015	0.015	3.185	0.0036	71.3
316	0.020	0.020	3.189	0.0048	99.1
417	0.025	0.025	3.192	0.0060	130.6
529	0.035	0.035	3.200	0.0085	165.3
526	0.040	0.040	3.204	0.0097	164.2
517	0.045	0.045	3.208	0.0109	161.2
530	0.055	0.055	3.216	0.0133	164.8
548	0.060	0.060	3.220	0.0145	170.2
547	0.065	0.065	3.224	0.0157	169.7
565	0.075	0.075	3.232	0.0181	174.8
576	0.080	0.080	3.236	0.0194	178.0
593	0.085	0.085	3.240	0.0206	183.0
601	0.095	0.095	3.248	0.0230	185.1
588	0.100	0.100	3.252	0.0242	180.8
579	0.105	0.105	3.256	0.0254	177.8
605	0.115	0.115	3.264	0.0278	185.4
618	0.120	0.120	3.268	0.0290	189.1
635	0.125	0.125	3.272	0.0302	194.1
663	0.135	0.135	3.280	0.0327	202.1
683	0.140	0.140	3.284	0.0339	208.0
693	0.145	0.145	3.288	0.0351	210.7
699	0.150	0.150	3.293	0.0363	212.3
664	0.160	0.160	3.301	0.0387	201.2
625	0.165	0.165	3.305	0.0399	189.1
592	0.170	0.170	3.309	0.0411	178.9
545	0.175	0.175	3.313	0.0423	164.5

# UNCONFINED COMPRESSION TESTING

Sample No. 0301-002 (28 day)



# UNCONFINED COMPRESSION TEST

ASTM D 2166

## SUMMARY OF RESULTS

PROJECT:	Norwich MGP		
PROJECT No.:	SE-0301		
SAMPLE No.:	0301-002 (28 day)		
TESTING DATE:	5/28/2009	LOADING RATE:	0.04 in./min.
TESTED BY:	SEM/MP	TRACKING CODE:	5880 US

TESTING PARAMETER AND RESULTS	
MOISTURE CONTENT	21.1 %
BULK UNIT WEIGHT	120.3 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	99.3 lb/ft <sup>3</sup>
UCS *	212.3 lb/in <sup>2</sup>

\* UCS - UNCONFINED COMPRESSIVE STRENGTH

## ASTM D 2166

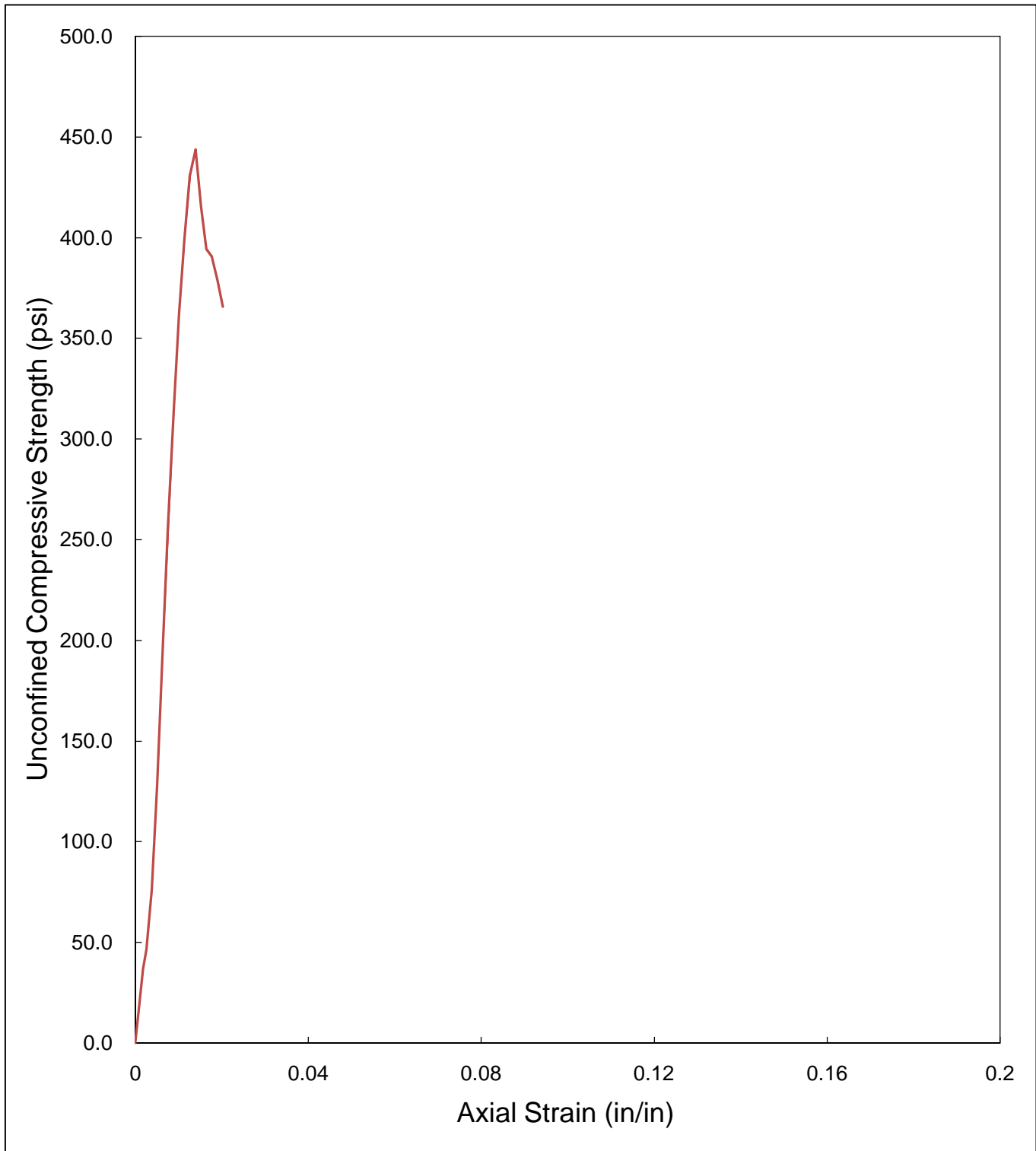
LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5810\_US

SOIL SPECIMEN DIMENSIONS		
	DIAMETER	LENGTH
No. 1	1.96 in.	3.95 in.
No. 2	1.99 in.	3.96 in.
No. 3	1.98 in.	3.95 in.
<b>Average</b>	<b>1.98 in.</b>	<b>3.95 in.</b>

[illegible]

# UNCONFINED COMPRESSION TESTING

Sample No. 0301-003 (7-Day)





# UNCONFINED COMPRESSION TEST

ASTM D 2166

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-003 (7-Day)  
TESTING DATE: 5/11/2009  
TESTED BY: RSL

LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5810\_US

TESTING PARAMETER AND RESULTS	
MOISTURE CONTENT	22.5 %
BULK UNIT WEIGHT	126.4 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	103.2 lb/ft <sup>3</sup>
UCS *	443.8 lb/in <sup>2</sup>

\* UCS - UNCONFINED COMPRESSIVE STRENGTH

## ASTM D 2166

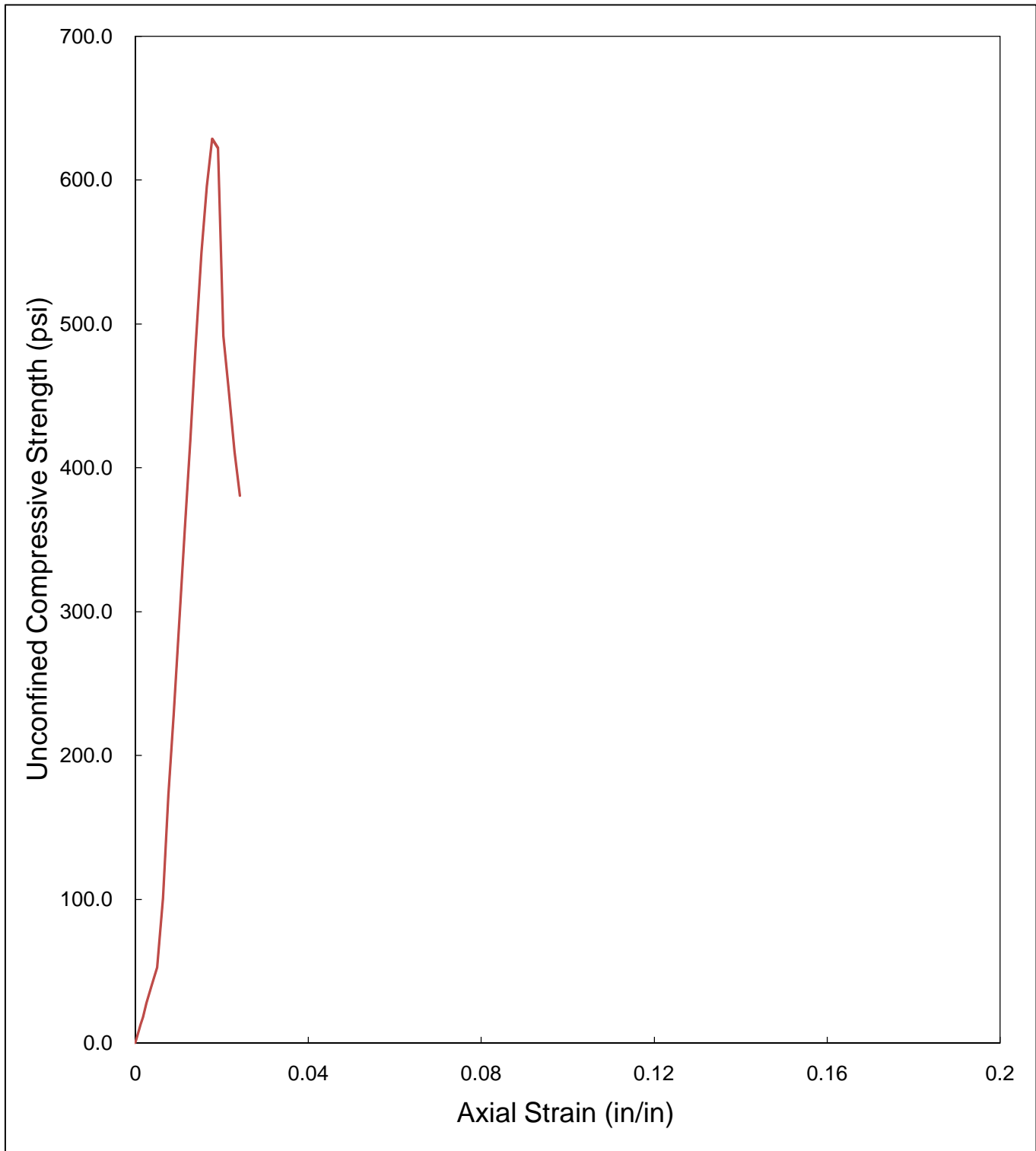
LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5837\_US

SOIL SPECIMEN DIMENSIONS		
	DIAMETER	LENGTH
No. 1	2.00 in.	3.93 in.
No. 2	2.00 in.	3.93 in.
No. 3	2.00 in.	3.93 in.
Average	2.00 in.	3.93 in.

[illegible]

# UNCONFINED COMPRESSION TESTING

Sample No. 0301-003 (14-Day)



# UNCONFINED COMPRESSION TEST

ASTM D 2166

## SUMMARY OF RESULTS

PROJECT:	Norwich MGP		
PROJECT No.:	SE-0301		
SAMPLE No.:	0301-003 (14-Day)		
TESTING DATE:	5/18/2009	LOADING RATE:	0.04 in./min.
TESTED BY:	SEM	TRACKING CODE:	5837_US

TESTING PARAMETER AND RESULTS	
MOISTURE CONTENT	16.5 %
BULK UNIT WEIGHT	126.1 lb/ft³
DRY UNIT WEIGHT	108.2 lb/ft³
UCS *	628.7 lb/in²

\* UCS - UNCONFINED COMPRESSIVE STRENGTH

## ASTM D 2166

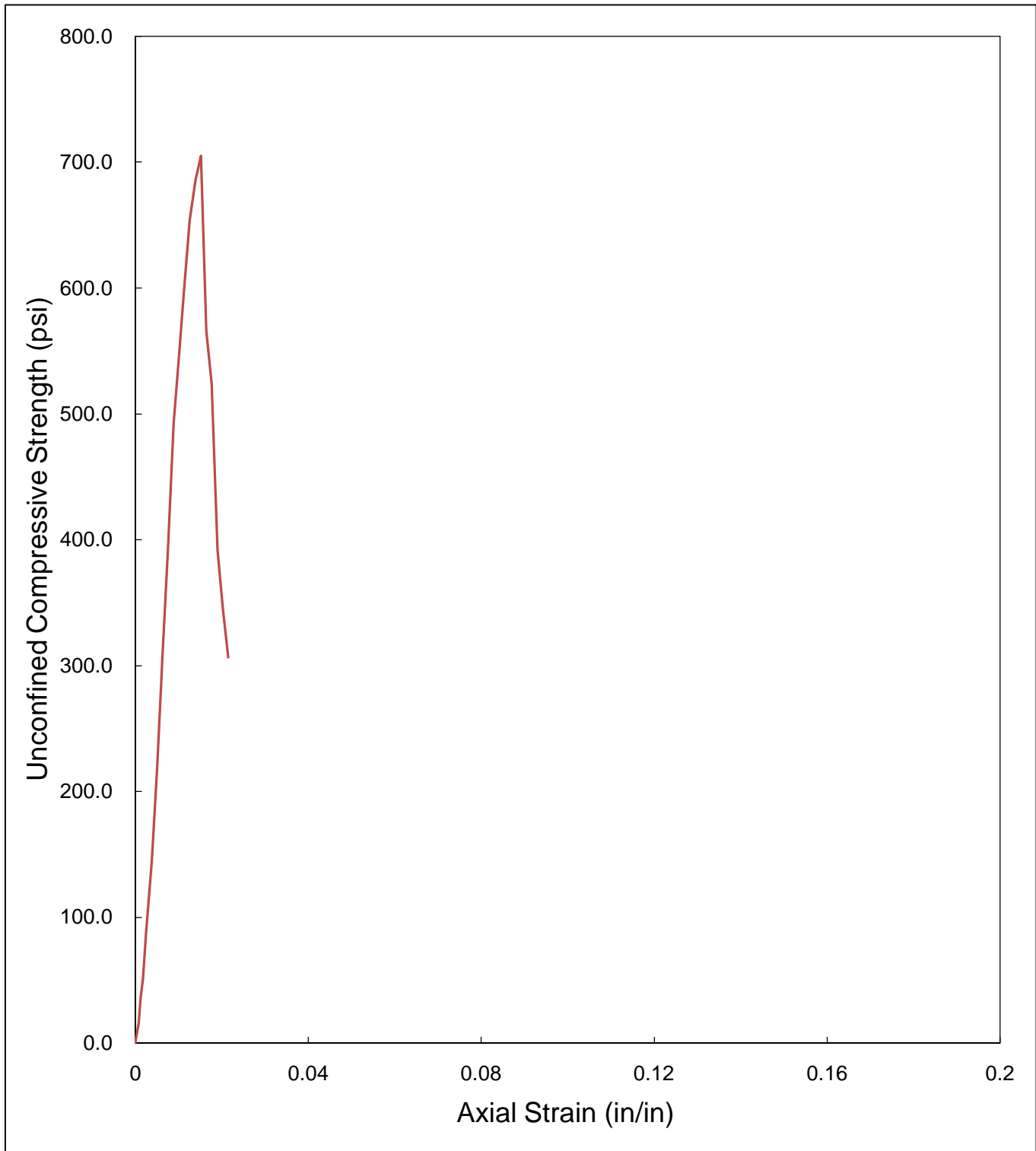
LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5883 US

<b>SOIL SPECIMEN DIMENSIONS</b>		
	<b>DIAMETER</b>	<b>LENGTH</b>
No. 1	1.97 in.	3.97 in.
No. 2	2.00 in.	3.97 in.
No. 3	2.02 in.	3.97 in.
<b>Average</b>	<b>2.00 in.</b>	<b>3.97 in.</b>

[illegible]

# UNCONFINED COMPRESSION TESTING

Sample No. 0301-003 (28 day)



# UNCONFINED COMPRESSION TEST

ASTM D 2166

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-003 (28 day)  
TESTING DATE: 6/1/2009  
TESTED BY: SEM

LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5883 US

TESTING PARAMETER AND RESULTS	
MOISTURE CONTENT	21.6 %
BULK UNIT WEIGHT	123.9 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	101.9 lb/ft <sup>3</sup>
UCS *	704.9 lb/in <sup>2</sup>

\* UCS - UNCONFINED COMPRESSIVE STRENGTH

# UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT: Norwich MGP  
 PROJECT No.: SE-0301  
 SAMPLE No.: 0301-004 (7-Day)  
 TESTING DATE: 12-May-09  
 TESTED BY: SEM

LOADING RATE: 0.04 in./min.  
 TRACKING CODE: 5814\_US

MOISTURE CONTENT (Dry Basis)	
1. MOISTURE TIN NO.	0301-004
2. WT MOISTURE TIN (tare weight)	66.25 g
3. WT WET SOIL + TARE	203.35 g
4. WT DRY SOIL + TARE	176.40 g
5. WT WATER, Ww	26.95 g
6. WT DRY SOIL, Ws	110.15 g
7. MOISTURE CONTENT, W	24.47 %

SOIL SPECIMEN DIMENSIONS		
	DIAMETER	LENGTH
No. 1	1.98 in.	3.97 in.
No. 2	1.99 in.	3.98 in.
No. 3	2.01 in.	3.98 in.
Average	1.99 in.	3.98 in.

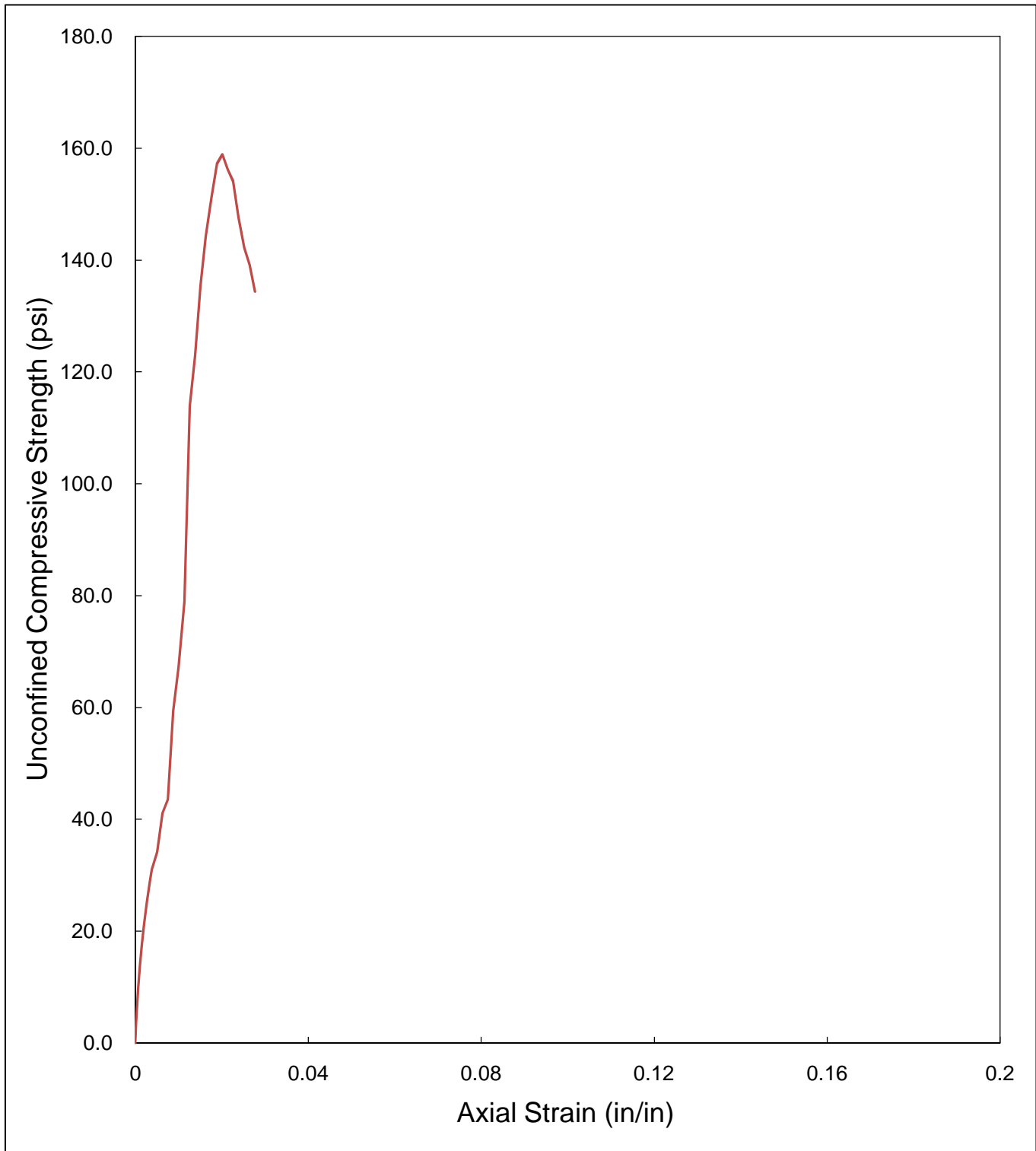
SPECIMEN CONDITIONS	
Initial Specimen WT, Wo	397.07 g
Initial Area, Ao	3.12 in <sup>2</sup>
Initial Volume, Vo	12.41 in <sup>3</sup>
Initial Bulk Unit Weight,	121.9 lb/ft <sup>3</sup>
Initial Dry Unit Weight	97.9 lb/ft <sup>3</sup>
15 % Strain (0.15 Lo)	0.60 in.
UCS	158.9 lb/in <sup>2</sup>

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in <sup>2</sup> )	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in <sup>2</sup> )
0	0.000	0.000	3.121	0.0000	0.0
34	0.003	0.003	3.123	0.0008	10.9
48	0.005	0.005	3.125	0.0013	15.4
61	0.007	0.007	3.126	0.0018	19.5
75	0.010	0.010	3.129	0.0025	24.0
97	0.015	0.015	3.132	0.0038	31.0
107	0.020	0.020	3.136	0.0050	34.1
129	0.025	0.025	3.140	0.0063	41.1
137	0.030	0.030	3.144	0.0075	43.6
187	0.035	0.035	3.148	0.0088	59.4
212	0.040	0.040	3.152	0.0101	67.3
249	0.045	0.045	3.156	0.0113	78.9
360	0.050	0.050	3.160	0.0126	113.9
389	0.055	0.055	3.164	0.0138	122.9
429	0.060	0.060	3.168	0.0151	135.4
458	0.065	0.065	3.173	0.0163	144.4
481	0.070	0.070	3.177	0.0176	151.4
500	0.075	0.075	3.181	0.0189	157.2
506	0.080	0.080	3.185	0.0201	158.9
498	0.085	0.085	3.189	0.0214	156.2
492	0.090	0.090	3.193	0.0226	154.1
472	0.095	0.095	3.197	0.0239	147.6
455	0.100	0.100	3.201	0.0251	142.1
446	0.105	0.105	3.205	0.0264	139.1
431	0.110	0.110	3.209	0.0277	134.3



# UNCONFINED COMPRESSION TESTING

Sample No. 0301-004 (7-Day)



# UNCONFINED COMPRESSION TEST

ASTM D 2166

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-004 (7-Day)  
TESTING DATE: 5/12/2009  
TESTED BY: SEM

LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5814\_US

TESTING PARAMETER AND RESULTS	
MOISTURE CONTENT	24.5 %
BULK UNIT WEIGHT	121.9 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	97.9 lb/ft <sup>3</sup>
UCS *	158.9 lb/in <sup>2</sup>

\* UCS - UNCONFINED COMPRESSIVE STRENGTH

## ASTM D 2166

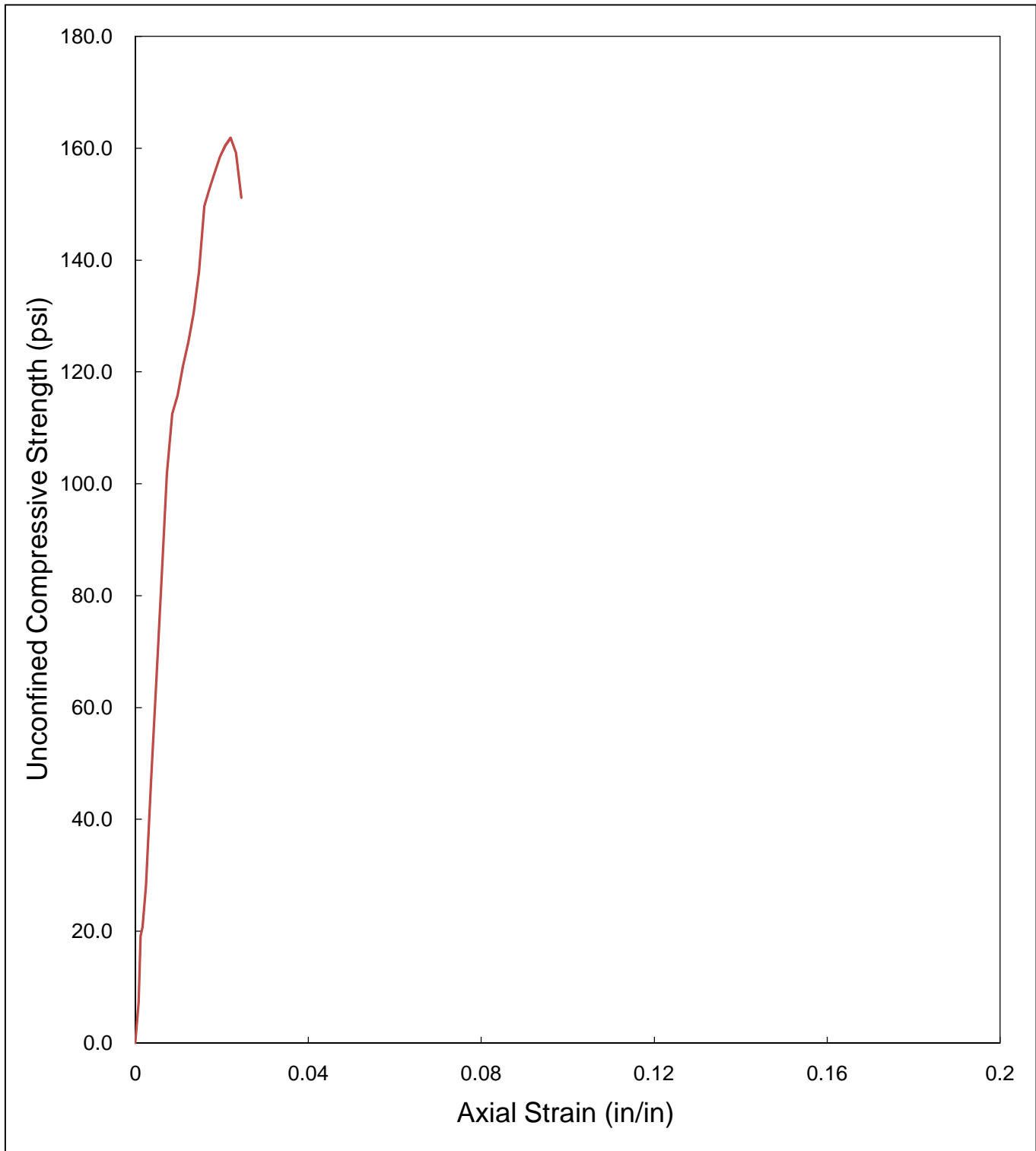
LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5839\_US

SOIL SPECIMEN DIMENSIONS		
	DIAMETER	LENGTH
No. 1	2.00 in.	4.08 in.
No. 2	1.98 in.	4.09 in.
No. 3	2.01 in.	4.09 in.
<b>Average</b>	<b>2.00 in.</b>	<b>4.09 in.</b>

[illegible]

# UNCONFINED COMPRESSION TESTING

Sample No. 0301-004 (14-Day)



# UNCONFINED COMPRESSION TEST

ASTM D 2166

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-004 (14-Day)  
TESTING DATE: 5/19/2009  
TESTED BY: SEM

LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5839\_US

TESTING PARAMETER AND RESULTS	
MOISTURE CONTENT	23.6 %
BULK UNIT WEIGHT	120.5 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	97.5 lb/ft <sup>3</sup>
UCS *	161.8 lb/in <sup>2</sup>

\* UCS - UNCONFINED COMPRESSIVE STRENGTH

## ASTM D 2166

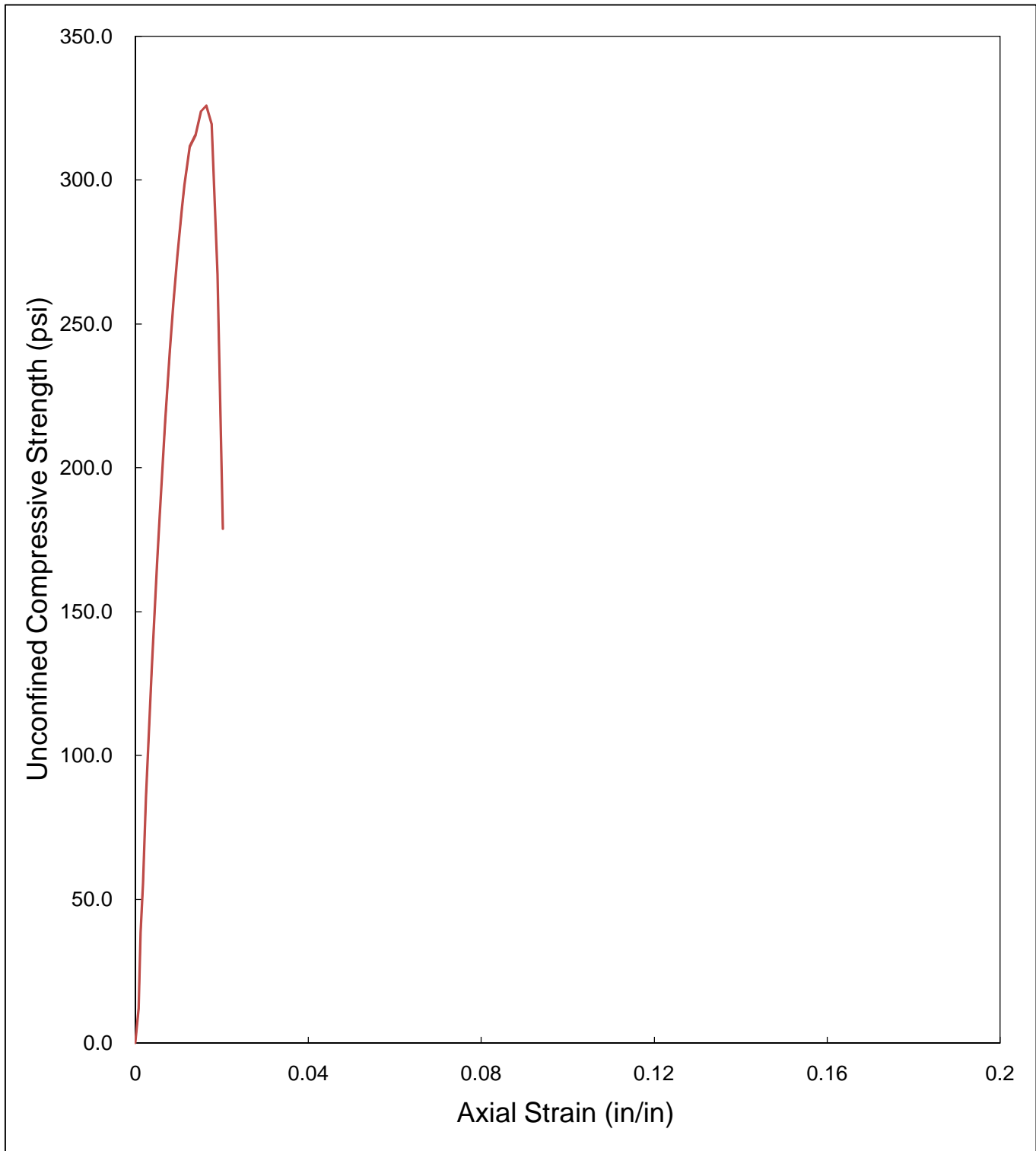
LOADING RATE:	0.04 in./min.
TRACKING CODE:	5894 US

SOIL SPECIMEN DIMENSIONS		
	DIAMETER	LENGTH
No. 1	1.99 in.	3.96 in.
No. 2	2.00 in.	3.96 in.
No. 3	2.01 in.	3.96 in.
Average	2.00 in.	3.96 in.

[illegible]

# UNCONFINED COMPRESSION TESTING

Sample No. 0301-004 (28 day)



# UNCONFINED COMPRESSION TEST

ASTM D 2166

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-004 (28 day)  
TESTING DATE: 6/2/2009  
TESTED BY: SEM

LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5894 US

TESTING PARAMETER AND RESULTS	
MOISTURE CONTENT	23.0 %
BULK UNIT WEIGHT	121.8 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	99.1 lb/ft <sup>3</sup>
UCS *	325.9 lb/in <sup>2</sup>

\* UCS - UNCONFINED COMPRESSIVE STRENGTH



## ASTM D 2166

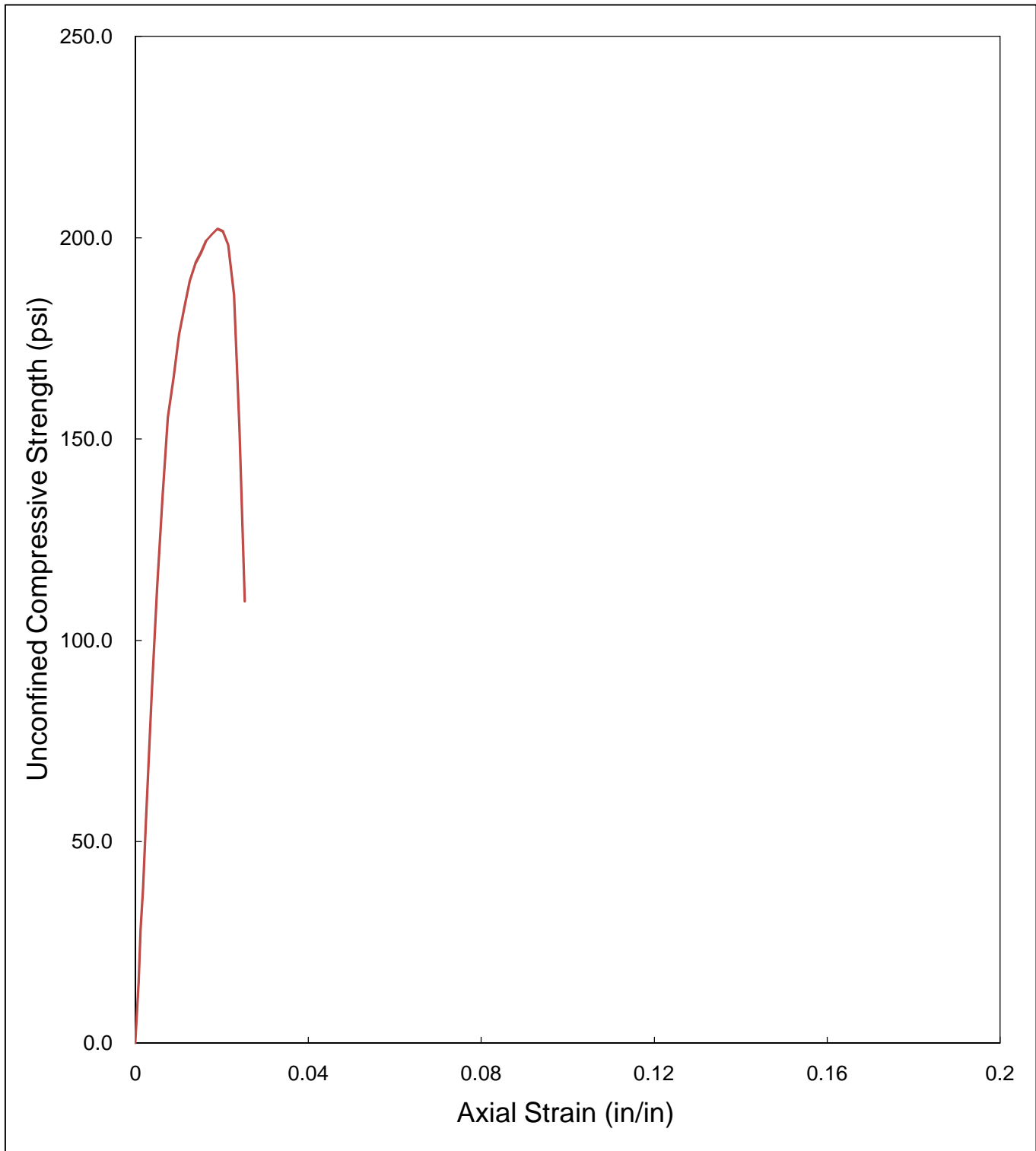
LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5815\_US

SOIL SPECIMEN DIMENSIONS		
	DIAMETER	LENGTH
No. 1	1.98 in.	3.96 in.
No. 2	1.99 in.	3.96 in.
No. 3	2.00 in.	3.96 in.
<b>Average</b>	<b>1.99 in.</b>	<b>3.96 in.</b>

[illegible]

# UNCONFINED COMPRESSION TESTING

Sample No. 0301-005 (7-Day)



# UNCONFINED COMPRESSION TEST

ASTM D 2166

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-005 (7-Day)  
TESTING DATE: 5/12/2009  
TESTED BY: SEM

LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5815\_US

TESTING PARAMETER AND RESULTS	
MOISTURE CONTENT	27.6 %
BULK UNIT WEIGHT	120.3 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	94.2 lb/ft <sup>3</sup>
UCS *	202.2 lb/in <sup>2</sup>

\* UCS - UNCONFINED COMPRESSIVE STRENGTH

## ASTM D 2166

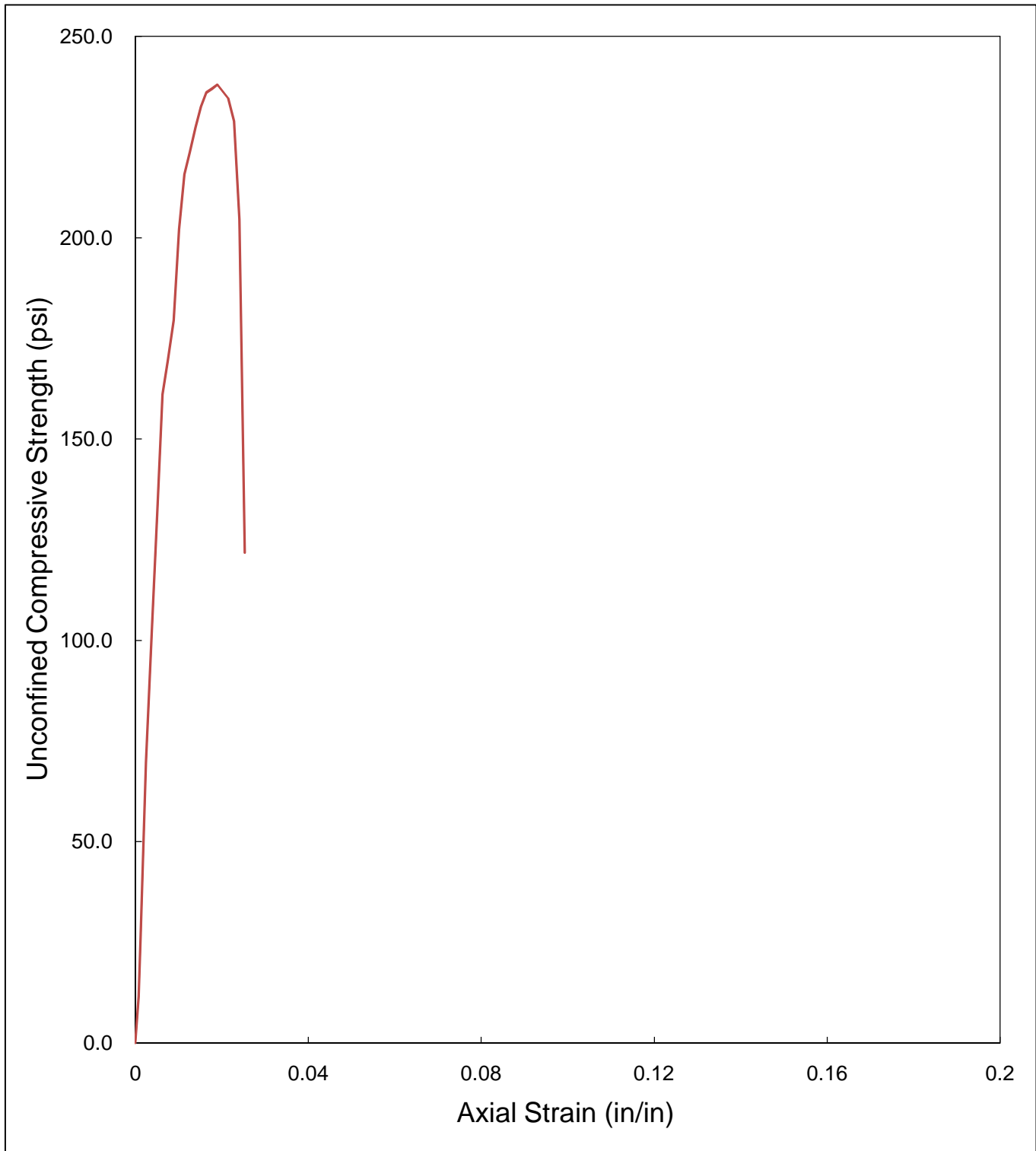
LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5840\_US

SOIL SPECIMEN DIMENSIONS		
	DIAMETER	LENGTH
No. 1	1.99 in.	3.96 in.
No. 2	1.99 in.	3.96 in.
No. 3	2.00 in.	3.96 in.
Average	1.99 in.	3.96 in.

[illegible]

# UNCONFINED COMPRESSION TESTING

Sample No. 0301-005 (14-Day)



# UNCONFINED COMPRESSION TEST

ASTM D 2166

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-005 (14-Day)  
TESTING DATE: 5/19/2009  
TESTED BY: SEM

LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5840\_US

TESTING PARAMETER AND RESULTS	
MOISTURE CONTENT	27.2 %
BULK UNIT WEIGHT	119.7 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	94.1 lb/ft <sup>3</sup>
UCS *	238.0 lb/in <sup>2</sup>

\* UCS - UNCONFINED COMPRESSIVE STRENGTH

## ASTM D 2166

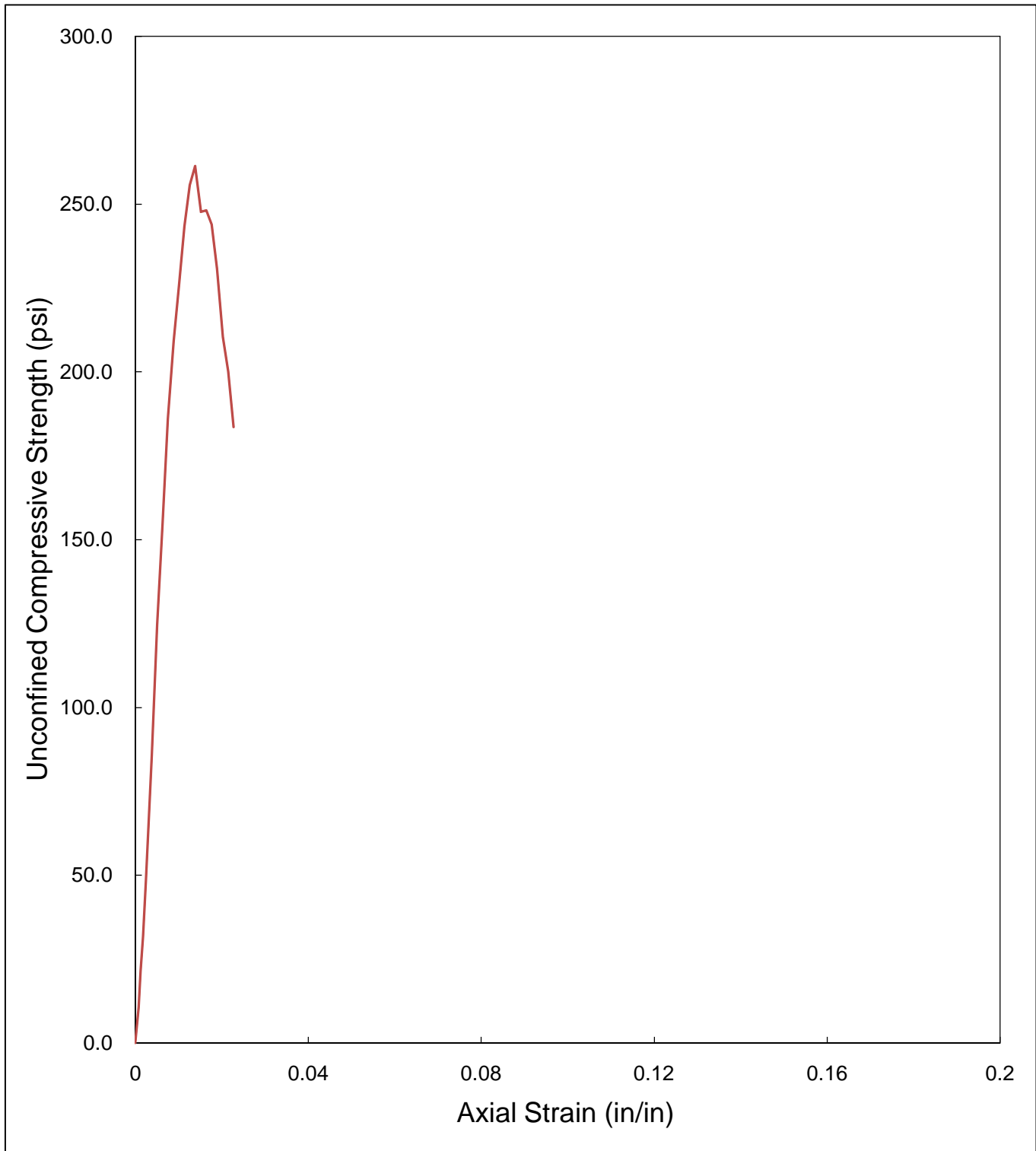
LOADING RATE:	0.04 in./min.
TRACKING CODE:	5893 US

SOIL SPECIMEN DIMENSIONS		
	DIAMETER	LENGTH
No. 1	1.98 in.	3.96 in.
No. 2	1.99 in.	3.96 in.
No. 3	2.01 in.	3.97 in.
Average	1.99 in.	3.96 in.

[illegible]

# UNCONFINED COMPRESSION TESTING

Sample No. 0301-005 (28 day)





# UNCONFINED COMPRESSION TEST

ASTM D 2166

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-005 (28 day)  
TESTING DATE: 6/2/2009  
TESTED BY: SEM

LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5893 US

TESTING PARAMETER AND RESULTS	
MOISTURE CONTENT	27.3 %
BULK UNIT WEIGHT	119.7 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	94.0 lb/ft <sup>3</sup>
UCS *	261.3 lb/in <sup>2</sup>

\* UCS - UNCONFINED COMPRESSIVE STRENGTH

## ASTM D 2166

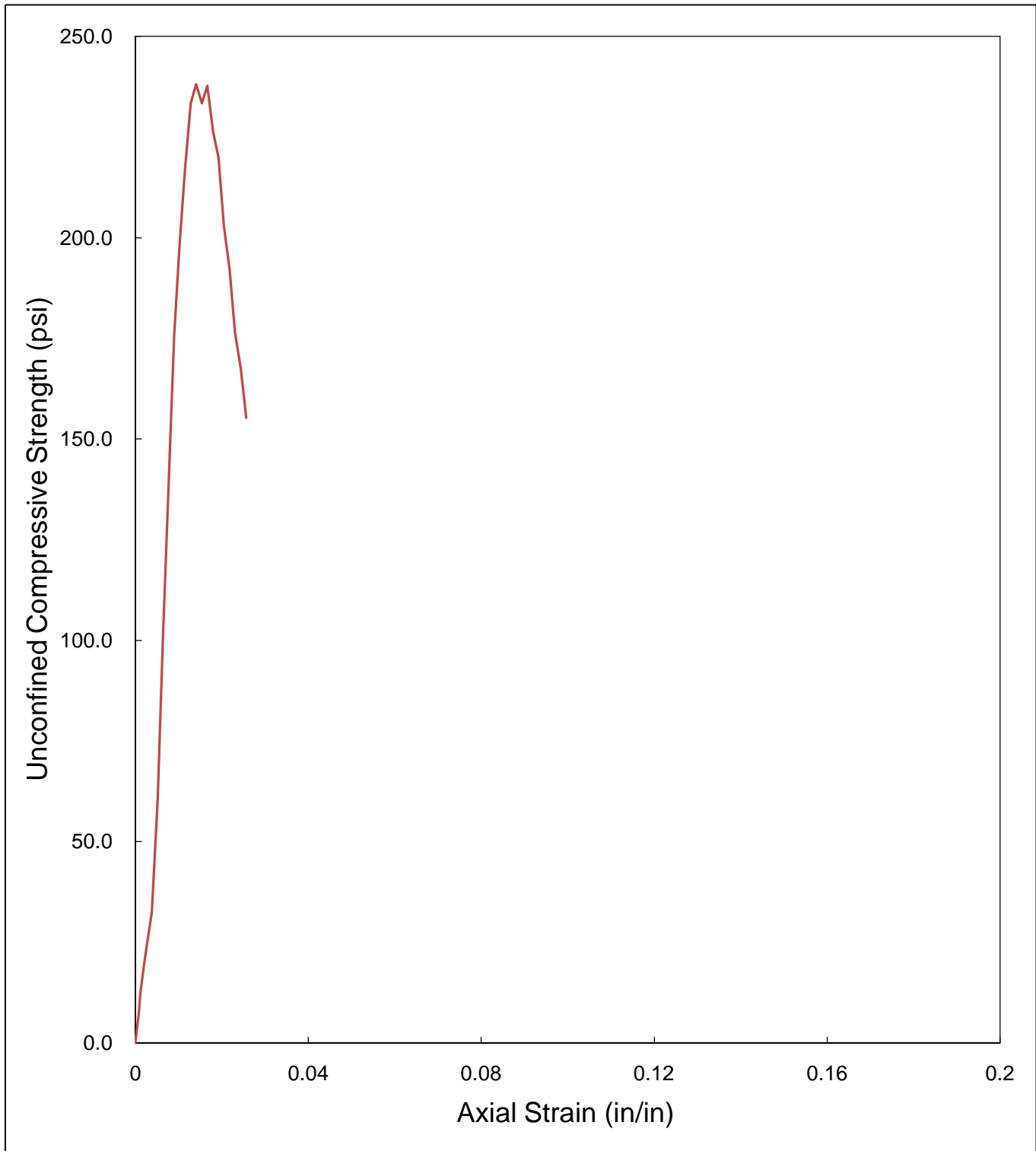
LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5816\_US

SOIL SPECIMEN DIMENSIONS		
	DIAMETER	LENGTH
No. 1	1.99 in.	3.90 in.
No. 2	2.00 in.	3.91 in.
No. 3	2.00 in.	3.91 in.
Average	2.00 in.	3.91 in.

[illegible]

# UNCONFINED COMPRESSION TESTING

Sample No. 0301-006 (7-Day)



# UNCONFINED COMPRESSION TEST

ASTM D 2166

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-006 (7-Day)  
TESTING DATE: 5/12/2009  
TESTED BY: SEM

LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5816\_US

TESTING PARAMETER AND RESULTS	
MOISTURE CONTENT	26.5 %
BULK UNIT WEIGHT	120.6 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	95.3 lb/ft <sup>3</sup>
UCS *	238.0 lb/in <sup>2</sup>

\* UCS - UNCONFINED COMPRESSIVE STRENGTH

## ASTM D 2166

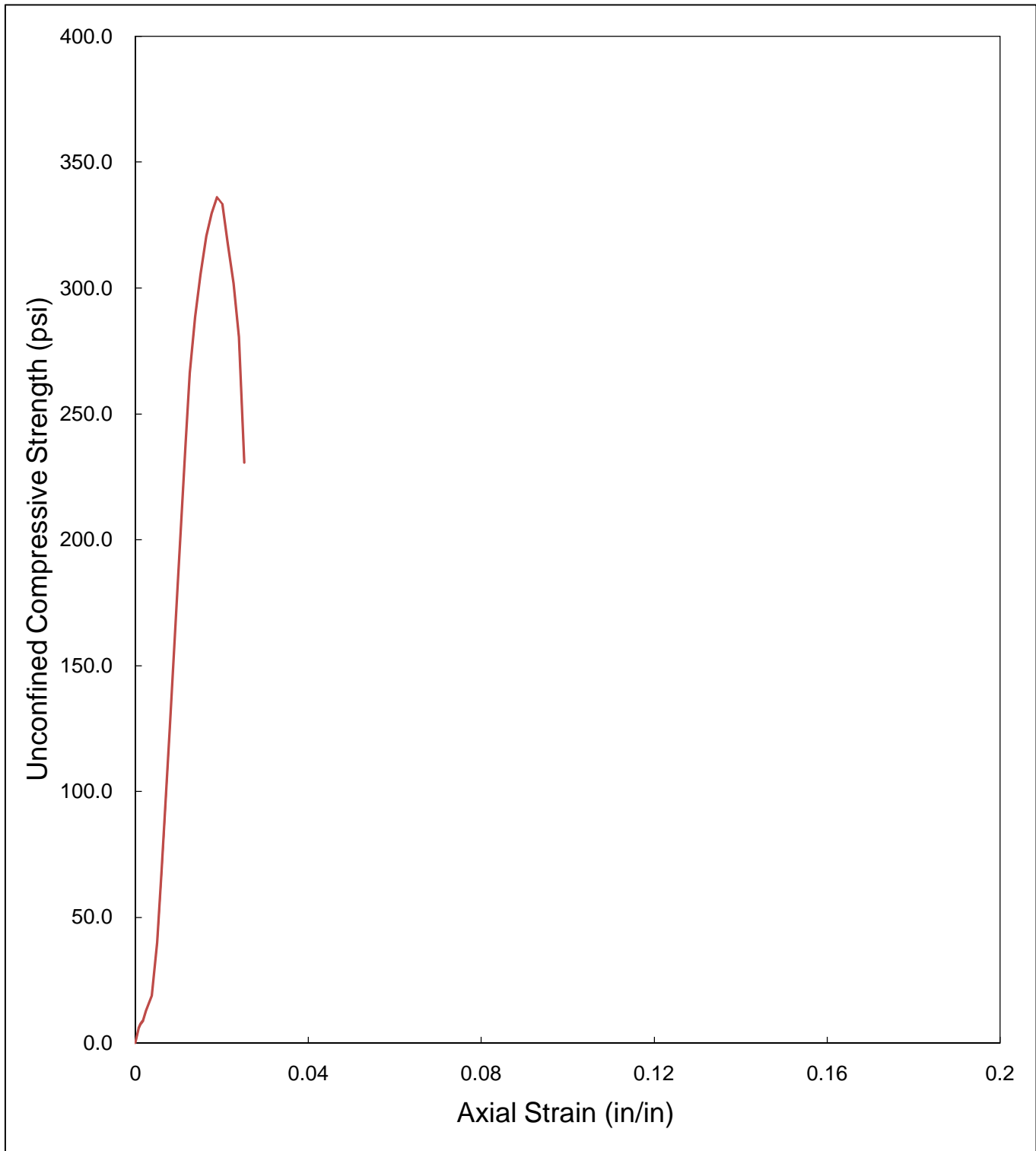
LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5841 US

SOIL SPECIMEN DIMENSIONS		
	DIAMETER	LENGTH
No. 1	2.00 in.	3.97 in.
No. 2	2.00 in.	3.98 in.
No. 3	2.00 in.	3.98 in.
<b>Average</b>	<b>2.00 in.</b>	<b>3.98 in.</b>

[illegible]

# UNCONFINED COMPRESSION TESTING

Sample No. 0301-006 (14-Day)



# UNCONFINED COMPRESSION TEST

ASTM D 2166

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-006 (14-Day)  
TESTING DATE: 5/19/2009  
TESTED BY: SEM

LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5841\_US

TESTING PARAMETER AND RESULTS	
MOISTURE CONTENT	25.2 %
BULK UNIT WEIGHT	120.6 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	96.3 lb/ft <sup>3</sup>
UCS *	336.0 lb/in <sup>2</sup>

\* UCS - UNCONFINED COMPRESSIVE STRENGTH

## ASTM D 2166

LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5892 US

SOIL SPECIMEN DIMENSIONS		
	DIAMETER	LENGTH
No. 1	1.99 in.	3.94 in.
No. 2	1.99 in.	3.94 in.
No. 3	2.00 in.	3.95 in.
<b>Average</b>	<b>1.99 in.</b>	<b>3.94 in.</b>

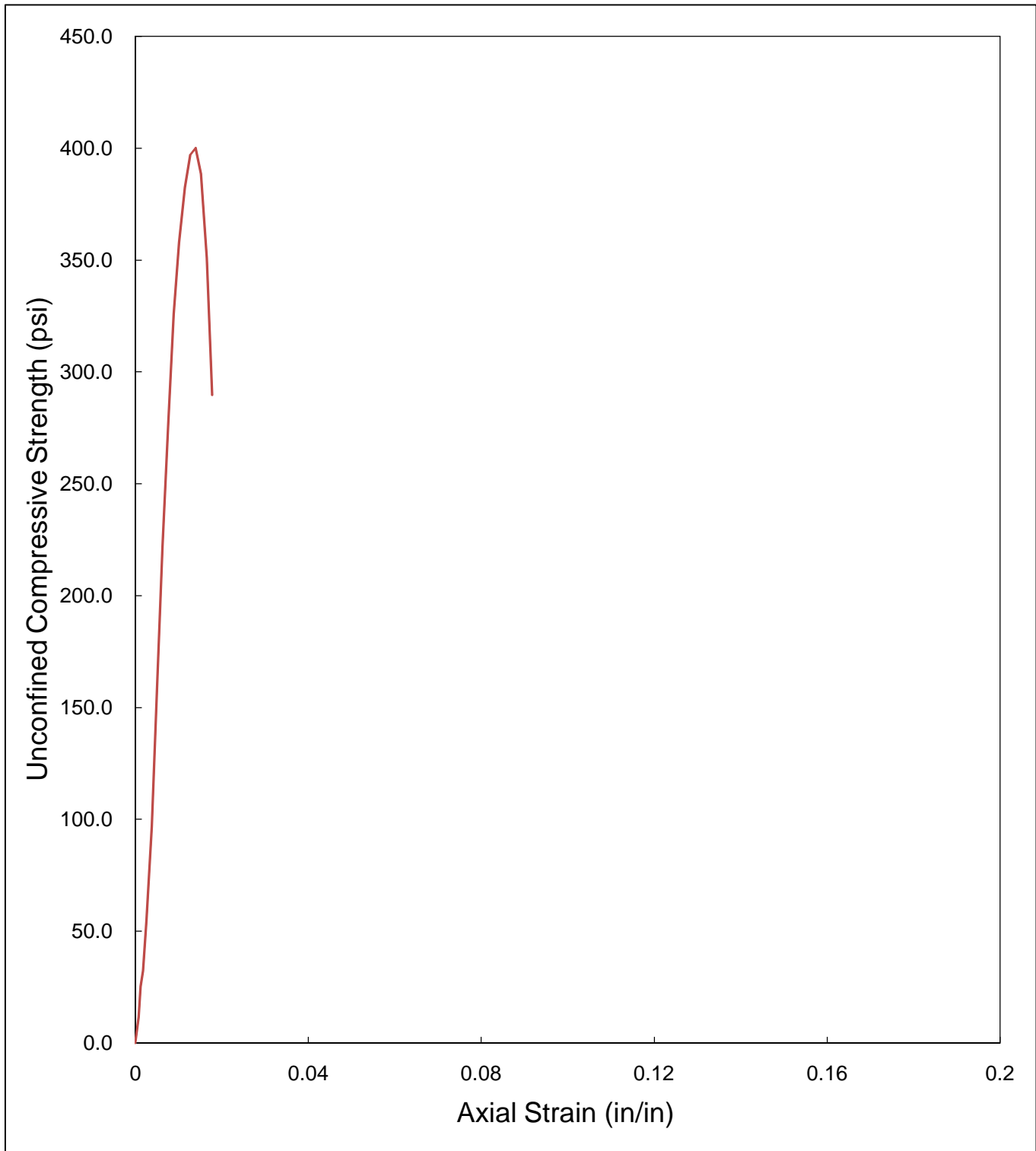
SPECIMEN CONDITIONS	
<b>Initial Specimen WT, Wo</b>	<b>393.19 g</b>
Initial Area, Ao	3.12 in <sup>2</sup>
Initial Volume, Vo	12.31 in <sup>3</sup>
Initial Bulk Unit Weight,	121.7 lb/ft <sup>3</sup>
Initial Dry Unit Weight	97.0 lb/ft <sup>3</sup>
15 % Strain (0.15 Lo)	0.59 in.
UCS	400.0 lb/in <sup>2</sup>

[illegible]



# UNCONFINED COMPRESSION TESTING

Sample No. 0301-006 (28 day)



# UNCONFINED COMPRESSION TEST

ASTM D 2166

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-006 (28 day)  
TESTING DATE: 6/2/2009  
TESTED BY: SEM

LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5892 US

TESTING PARAMETER AND RESULTS	
MOISTURE CONTENT	25.4 %
BULK UNIT WEIGHT	121.7 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	97.0 lb/ft <sup>3</sup>
UCS *	400.0 lb/in <sup>2</sup>

\* UCS - UNCONFINED COMPRESSIVE STRENGTH

# UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT: Norwich MGP  
 PROJECT No.: SE-0301  
 SAMPLE No.: 0301-007 (7-Day)  
 TESTING DATE: 13-May-09  
 TESTED BY: RSL

LOADING RATE: 0.04 in./min.  
 TRACKING CODE: 5822\_US

MOISTURE CONTENT (Dry Basis)	
1. MOISTURE TIN NO.	0301-007
2. WT MOISTURE TIN (tare weight)	85.96 g
3. WT WET SOIL + TARE	141.50 g
4. WT DRY SOIL + TARE	127.45 g
5. WT WATER, W <sub>w</sub>	14.05 g
6. WT DRY SOIL, W <sub>s</sub>	41.49 g
7. MOISTURE CONTENT, W	33.86 %

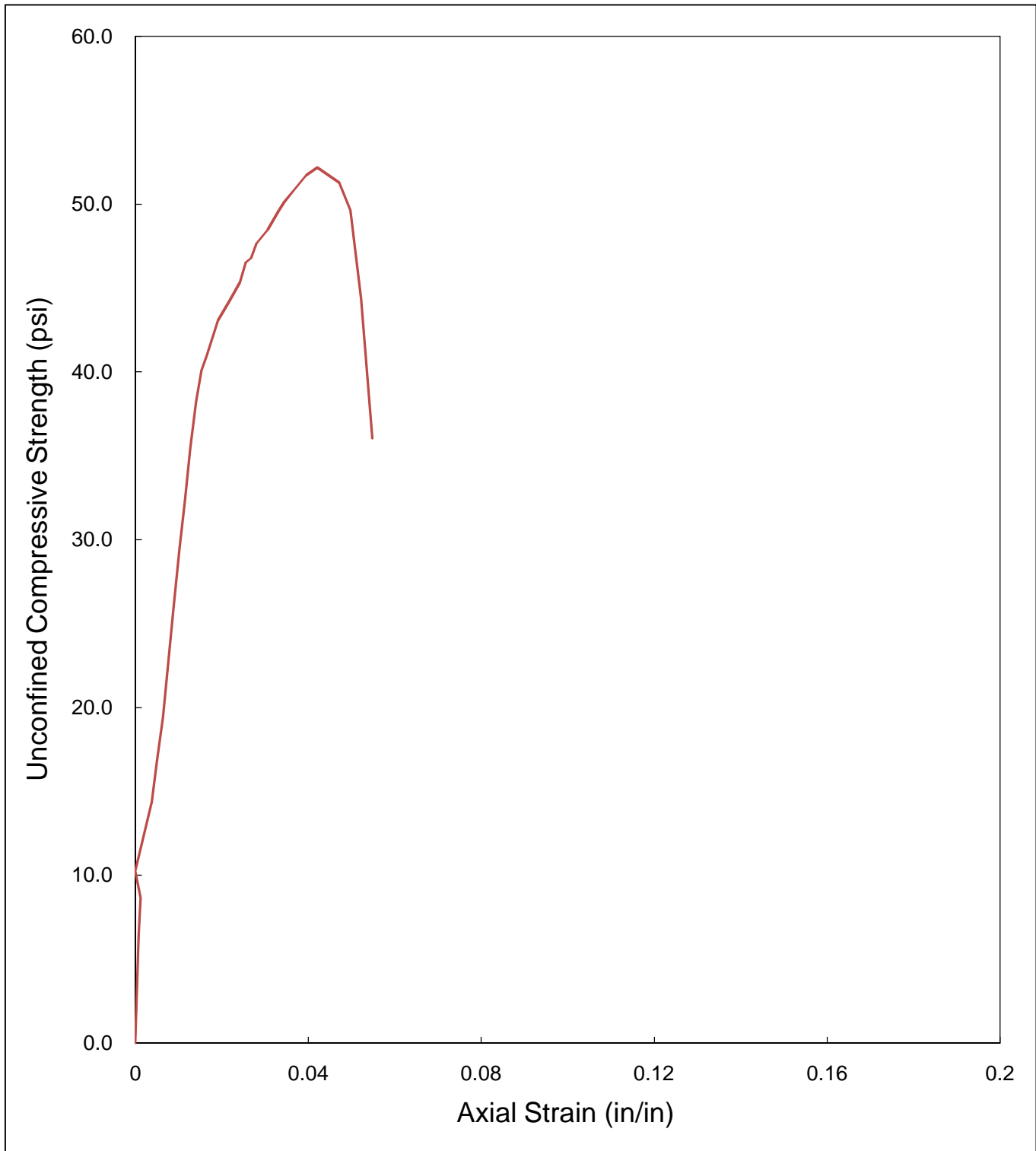
SOIL SPECIMEN DIMENSIONS		
	DIAMETER	LENGTH
No. 1	2.00 in.	3.92 in.
No. 2	2.00 in.	3.92 in.
No. 3	1.98 in.	3.92 in.
Average	1.99 in.	3.92 in.

SPECIMEN CONDITIONS	
Initial Specimen WT, W <sub>o</sub>	375.79 g
Initial Area, A <sub>o</sub>	3.12 in <sup>2</sup>
Initial Volume, V <sub>o</sub>	12.23 in <sup>3</sup>
Initial Bulk Unit Weight,	117.0 lb/ft <sup>3</sup>
Initial Dry Unit Weight	87.4 lb/ft <sup>3</sup>
15 % Strain (0.15 L <sub>o</sub> )	0.59 in.
UCS	52.2 lb/in <sup>2</sup>

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in <sup>2</sup> )	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in <sup>2</sup> )
0	0.000	0.000	3.121	0.0000	0.0
20	0.003	0.003	3.123	0.0008	6.4
27	0.005	0.005	3.125	0.0013	8.6
32	0.000	0.000	3.121	0.0000	10.3
45	0.015	0.015	3.133	0.0038	14.4
53	0.020	0.020	3.137	0.0051	16.9
61	0.025	0.025	3.141	0.0064	19.4
82	0.035	0.035	3.149	0.0089	26.0
93	0.040	0.040	3.153	0.0102	29.5
102	0.045	0.045	3.157	0.0115	32.3
112	0.050	0.050	3.161	0.0128	35.4
121	0.055	0.055	3.165	0.0140	38.2
127	0.060	0.060	3.169	0.0153	40.1
130	0.065	0.065	3.173	0.0166	41.0
137	0.075	0.075	3.182	0.0191	43.1
141	0.085	0.085	3.190	0.0217	44.2
145	0.095	0.095	3.198	0.0242	45.3
149	0.100	0.100	3.202	0.0255	46.5
150	0.105	0.105	3.207	0.0268	46.8
153	0.110	0.110	3.211	0.0281	47.7
156	0.120	0.120	3.219	0.0306	48.5
160	0.130	0.130	3.228	0.0332	49.6
162	0.135	0.135	3.232	0.0344	50.1
165	0.145	0.145	3.241	0.0370	50.9
168	0.155	0.155	3.249	0.0395	51.7
170	0.165	0.165	3.258	0.0421	52.2
168	0.185	0.185	3.275	0.0472	51.3
163	0.195	0.195	3.284	0.0497	49.6
146	0.205	0.205	3.293	0.0523	44.3
119	0.215	0.215	3.302	0.0548	36.0

# UNCONFINED COMPRESSION TESTING

Sample No. 0301-007 (7-Day)



# UNCONFINED COMPRESSION TEST

ASTM D 2166

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-007 (7-Day)  
TESTING DATE: 5/13/2009  
TESTED BY: RSL

LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5822\_US

TESTING PARAMETER AND RESULTS	
MOISTURE CONTENT	33.9 %
BULK UNIT WEIGHT	117.0 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	87.4 lb/ft <sup>3</sup>
UCS *	52.2 lb/in <sup>2</sup>

\* UCS - UNCONFINED COMPRESSIVE STRENGTH

# UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT: Norwich MGP  
 PROJECT No.: SE-0301  
 SAMPLE No.: 0301-007 (14-Day)  
 TESTING DATE: 20-May-09  
 TESTED BY: KG

LOADING RATE: 0.04 in./min.  
 TRACKING CODE: 5845\_US

MOISTURE CONTENT (Dry Basis)	
1. MOISTURE TIN NO.	0301-007
2. WT MOISTURE TIN (tare weight)	68.99 g
3. WT WET SOIL + TARE	109.00 g
4. WT DRY SOIL + TARE	98.97 g
5. WT WATER, Ww	10.03 g
6. WT DRY SOIL, Ws	29.98 g
7. MOISTURE CONTENT, W	33.46 %

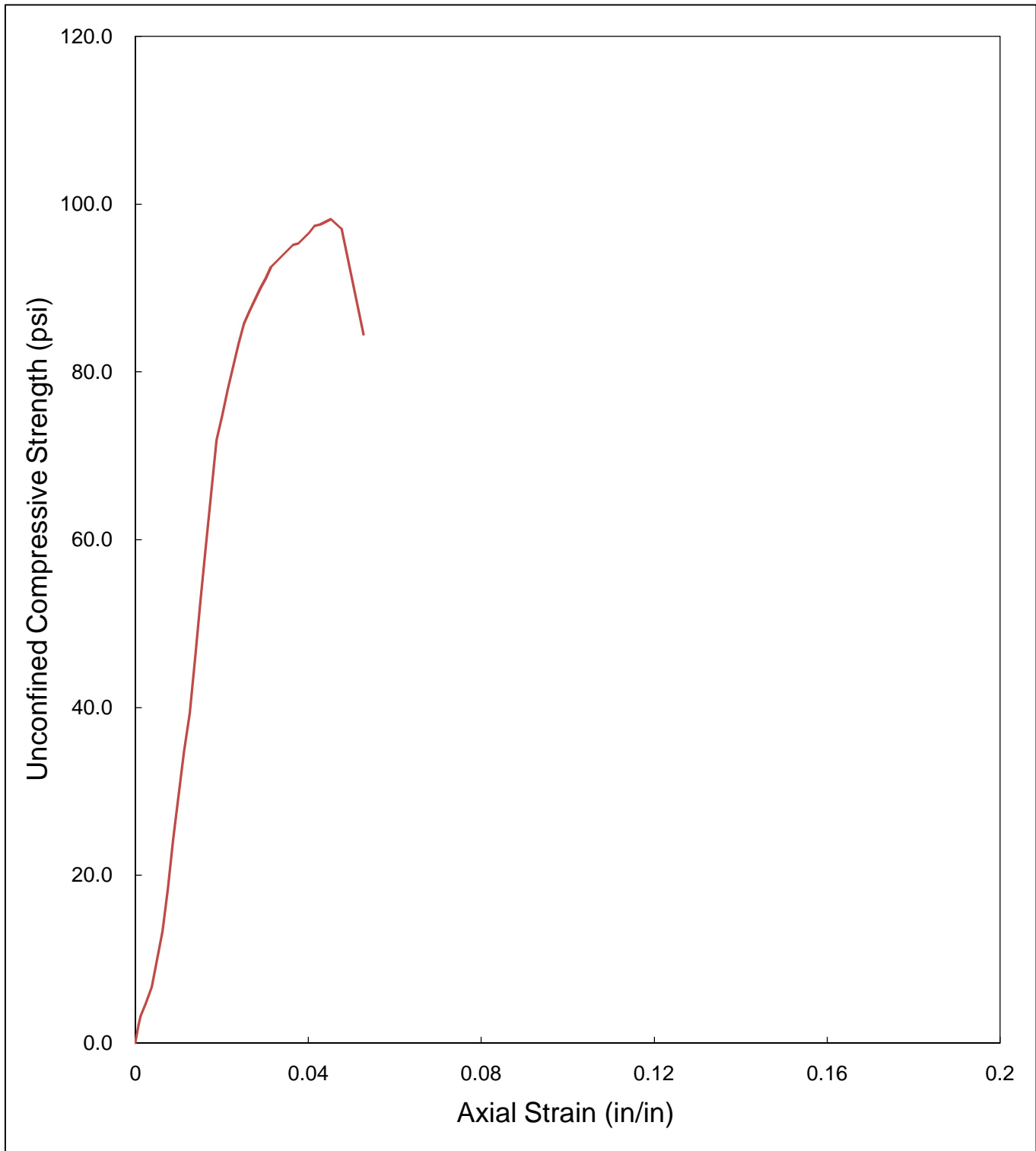
SOIL SPECIMEN DIMENSIONS		
	DIAMETER	LENGTH
No. 1	2.00 in.	4.01 in.
No. 2	2.01 in.	3.96 in.
No. 3	1.99 in.	3.98 in.
Average	2.00 in.	3.98 in.

SPECIMEN CONDITIONS	
Initial Specimen WT, Wo	380.68 g
Initial Area, Ao	3.14 in <sup>2</sup>
Initial Volume, Vo	12.51 in <sup>3</sup>
Initial Bulk Unit Weight,	115.9 lb/ft <sup>3</sup>
Initial Dry Unit Weight	86.8 lb/ft <sup>3</sup>
15 % Strain (0.15 Lo)	0.60 in.
UCS	98.2 lb/in <sup>2</sup>

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in <sup>2</sup> )	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in <sup>2</sup> )
0	0.000	0.000	3.142	0.0000	0.0
7	0.003	0.003	3.144	0.0008	2.2
10	0.005	0.005	3.146	0.0013	3.2
15	0.010	0.010	3.149	0.0025	4.8
21	0.015	0.015	3.153	0.0038	6.7
42	0.025	0.025	3.161	0.0063	13.3
58	0.030	0.030	3.165	0.0075	18.3
77	0.035	0.035	3.169	0.0088	24.3
110	0.045	0.045	3.177	0.0113	34.6
125	0.050	0.050	3.182	0.0126	39.3
146	0.055	0.055	3.186	0.0138	45.8
168	0.060	0.060	3.190	0.0151	52.7
189	0.065	0.065	3.194	0.0163	59.2
230	0.075	0.075	3.202	0.0188	71.8
240	0.080	0.080	3.206	0.0201	74.9
250	0.085	0.085	3.210	0.0213	77.9
268	0.095	0.095	3.218	0.0238	83.3
276	0.100	0.100	3.222	0.0251	85.6
281	0.105	0.105	3.227	0.0264	87.1
291	0.115	0.115	3.235	0.0289	90.0
295	0.120	0.120	3.239	0.0301	91.1
300	0.125	0.125	3.243	0.0314	92.5
305	0.135	0.135	3.252	0.0339	93.8
310	0.145	0.145	3.260	0.0364	95.1
311	0.150	0.150	3.265	0.0377	95.3
316	0.160	0.160	3.273	0.0402	96.5
319	0.165	0.165	3.277	0.0414	97.3
320	0.170	0.170	3.282	0.0427	97.5
323	0.180	0.180	3.290	0.0452	98.2
320	0.190	0.190	3.299	0.0477	97.0
280	0.210	0.210	3.316	0.0527	84.4

# UNCONFINED COMPRESSION TESTING

Sample No. 0301-007 (14-Day)



# UNCONFINED COMPRESSION TEST

ASTM D 2166

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-007 (14-Day)  
TESTING DATE: 5/20/2009  
TESTED BY: KG

LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5845\_US

TESTING PARAMETER AND RESULTS	
MOISTURE CONTENT	33.5 %
BULK UNIT WEIGHT	115.9 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	86.8 lb/ft <sup>3</sup>
UCS *	98.2 lb/in <sup>2</sup>

\* UCS - UNCONFINED COMPRESSIVE STRENGTH



# UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT: Norwich MGP  
 PROJECT No.: SE-0301  
 SAMPLE No.: 0301-007 (28 day)  
 TESTING DATE: 3-Jun-09  
 TESTED BY: KG

LOADING RATE: 0.04 in./min.  
 TRACKING CODE: 5905\_US

MOISTURE CONTENT (Dry Basis)	
1. MOISTURE TIN NO.	0301-007
2. WT MOISTURE TIN (tare weight)	67.10 g
3. WT WET SOIL + TARE	104.80 g
4. WT DRY SOIL + TARE	95.39 g
5. WT WATER, Ww	9.41 g
6. WT DRY SOIL, Ws	28.29 g
7. MOISTURE CONTENT, W	33.26 %

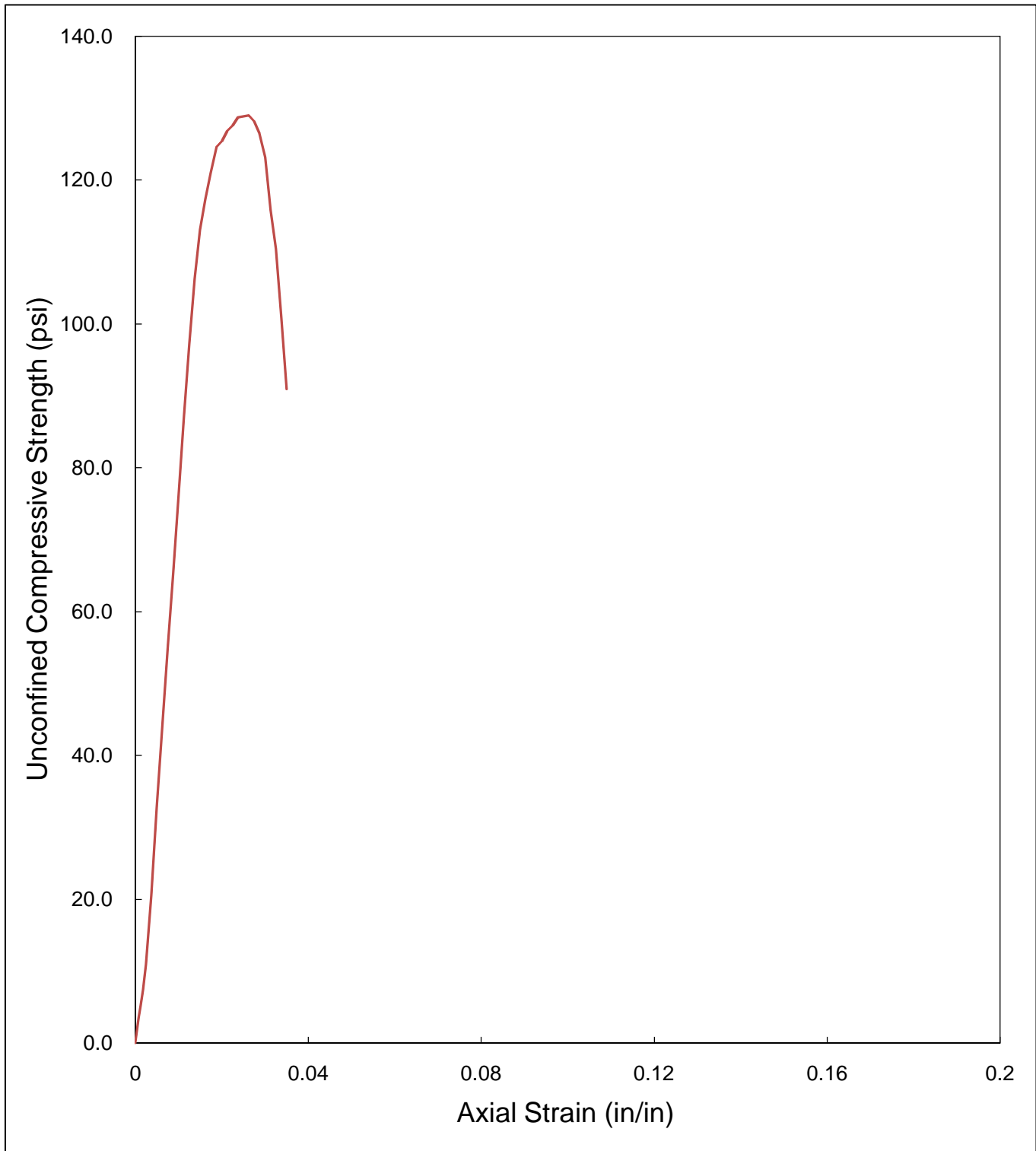
SOIL SPECIMEN DIMENSIONS		
	DIAMETER	LENGTH
No. 1	2.00 in.	4.02 in.
No. 2	1.98 in.	4.00 in.
No. 3	1.99 in.	3.99 in.
Average	1.99 in.	4.00 in.

SPECIMEN CONDITIONS	
Initial Specimen WT, Wo	383.16 g
Initial Area, Ao	3.11 in <sup>2</sup>
Initial Volume, Vo	12.45 in <sup>3</sup>
Initial Bulk Unit Weight,	117.2 lb/ft <sup>3</sup>
Initial Dry Unit Weight	88.0 lb/ft <sup>3</sup>
15 % Strain (0.15 Lo)	0.60 in.
UCS	129.0 lb/in <sup>2</sup>

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in <sup>2</sup> )	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in <sup>2</sup> )
0	0.000	0.000	3.110	0.0000	0.0
11	0.003	0.003	3.113	0.0007	3.5
16	0.005	0.005	3.114	0.0012	5.1
23	0.007	0.007	3.116	0.0017	7.4
34	0.010	0.010	3.118	0.0025	10.9
64	0.015	0.015	3.122	0.0037	20.5
102	0.020	0.020	3.126	0.0050	32.6
139	0.025	0.025	3.130	0.0062	44.4
173	0.030	0.030	3.134	0.0075	55.2
205	0.035	0.035	3.138	0.0087	65.3
239	0.040	0.040	3.142	0.0100	76.1
274	0.045	0.045	3.146	0.0112	87.1
306	0.050	0.050	3.150	0.0125	97.2
335	0.055	0.055	3.154	0.0137	106.2
357	0.060	0.060	3.158	0.0150	113.1
371	0.065	0.065	3.162	0.0162	117.3
383	0.070	0.070	3.166	0.0175	121.0
395	0.075	0.075	3.170	0.0187	124.6
398	0.080	0.080	3.174	0.0200	125.4
403	0.085	0.085	3.178	0.0212	126.8
406	0.090	0.090	3.182	0.0225	127.6
410	0.095	0.095	3.186	0.0237	128.7
412	0.105	0.105	3.194	0.0262	129.0
410	0.110	0.110	3.198	0.0275	128.2
405	0.115	0.115	3.202	0.0287	126.5
395	0.120	0.120	3.206	0.0300	123.2
372	0.125	0.125	3.210	0.0312	115.9
355	0.130	0.130	3.215	0.0325	110.4
325	0.135	0.135	3.219	0.0337	101.0
293	0.140	0.140	3.223	0.0350	90.9

# UNCONFINED COMPRESSION TESTING

Sample No. 0301-007 (28 day)



# UNCONFINED COMPRESSION TEST

ASTM D 2166

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-007 (28 day)  
TESTING DATE: 6/3/2009  
TESTED BY: KG

LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5905\_US

TESTING PARAMETER AND RESULTS	
MOISTURE CONTENT	33.3 %
BULK UNIT WEIGHT	117.2 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	88.0 lb/ft <sup>3</sup>
UCS *	129.0 lb/in <sup>2</sup>

\* UCS - UNCONFINED COMPRESSIVE STRENGTH

# UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT: Norwich MGP  
 PROJECT No.: SE-0301  
 SAMPLE No.: 0301-008 (7-Day)  
 TESTING DATE: 13-May-09  
 TESTED BY: RSL

LOADING RATE: 0.04 in./min.  
 TRACKING CODE: 5823\_US

MOISTURE CONTENT (Dry Basis)	
1. MOISTURE TIN NO.	0301-008
2. WT MOISTURE TIN (tare weight)	62.31 g
3. WT WET SOIL + TARE	130.11 g
4. WT DRY SOIL + TARE	111.97 g
5. WT WATER, Ww	18.14 g
6. WT DRY SOIL, Ws	49.66 g
7. MOISTURE CONTENT, W	36.53 %

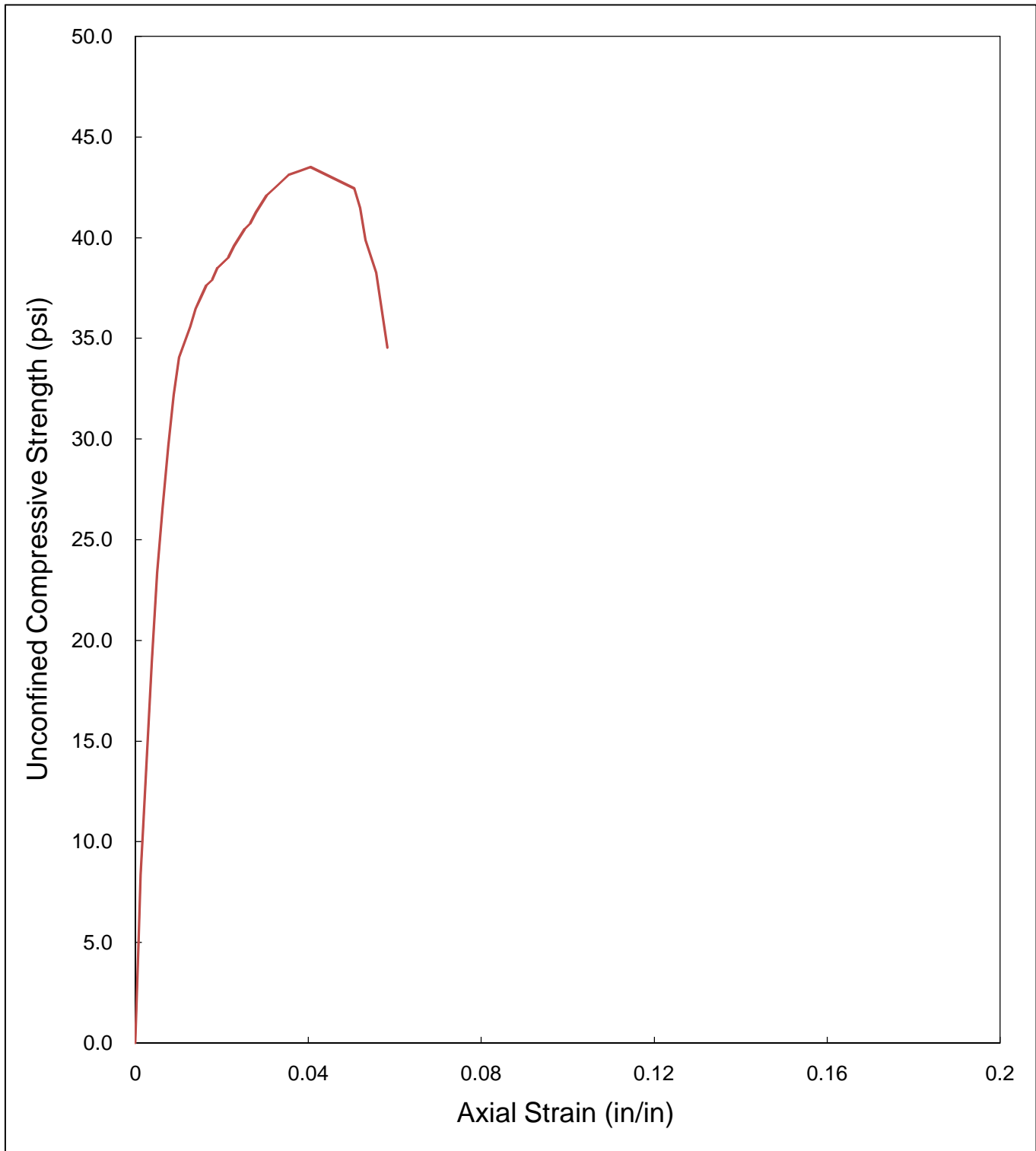
SOIL SPECIMEN DIMENSIONS		
	DIAMETER	LENGTH
No. 1	2.00 in.	3.95 in.
No. 2	1.99 in.	3.95 in.
No. 3	1.98 in.	3.94 in.
Average	1.99 in.	3.95 in.

SPECIMEN CONDITIONS	
Initial Specimen WT, Wo	371.98 g
Initial Area, Ao	3.11 in <sup>2</sup>
Initial Volume, Vo	12.28 in <sup>3</sup>
Initial Bulk Unit Weight,	115.4 lb/ft <sup>3</sup>
Initial Dry Unit Weight	84.6 lb/ft <sup>3</sup>
15 % Strain (0.15 Lo)	0.59 in.
UCS	43.5 lb/in <sup>2</sup>

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in <sup>2</sup> )	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in <sup>2</sup> )
0	0.000	0.000	3.110	0.0000	0.0
16	0.003	0.003	3.113	0.0008	5.1
26	0.005	0.005	3.114	0.0013	8.3
33	0.007	0.007	3.116	0.0018	10.6
59	0.015	0.015	3.122	0.0038	18.9
73	0.020	0.020	3.126	0.0051	23.4
83	0.025	0.025	3.130	0.0063	26.5
93	0.030	0.030	3.134	0.0076	29.7
101	0.035	0.035	3.138	0.0089	32.2
107	0.040	0.040	3.142	0.0101	34.1
112	0.050	0.050	3.150	0.0127	35.6
115	0.055	0.055	3.154	0.0139	36.5
117	0.060	0.060	3.158	0.0152	37.0
119	0.065	0.065	3.162	0.0165	37.6
120	0.070	0.070	3.166	0.0177	37.9
122	0.075	0.075	3.171	0.0190	38.5
124	0.085	0.085	3.179	0.0215	39.0
126	0.090	0.090	3.183	0.0228	39.6
129	0.100	0.100	3.191	0.0253	40.4
130	0.105	0.105	3.195	0.0266	40.7
132	0.110	0.110	3.199	0.0279	41.3
135	0.120	0.120	3.208	0.0304	42.1
137	0.130	0.130	3.216	0.0329	42.6
139	0.140	0.140	3.225	0.0355	43.1
140	0.150	0.150	3.233	0.0380	43.3
141	0.160	0.160	3.242	0.0405	43.5
139	0.200	0.200	3.276	0.0507	42.4
136	0.205	0.205	3.281	0.0519	41.5
131	0.210	0.210	3.285	0.0532	39.9
126	0.220	0.220	3.294	0.0557	38.3
114	0.230	0.230	3.303	0.0583	34.5

# UNCONFINED COMPRESSION TESTING

Sample No. 0301-008 (7-Day)



# UNCONFINED COMPRESSION TEST

ASTM D 2166

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-008 (7-Day)  
TESTING DATE: 5/13/2009  
TESTED BY: RSL

LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5823\_US

TESTING PARAMETER AND RESULTS	
MOISTURE CONTENT	36.5 %
BULK UNIT WEIGHT	115.4 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	84.6 lb/ft <sup>3</sup>
UCS *	43.5 lb/in <sup>2</sup>

\* UCS - UNCONFINED COMPRESSIVE STRENGTH

# UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT: Norwich MGP  
 PROJECT No.: SE-0301  
 SAMPLE No.: 0301-008 (14-Day)  
 TESTING DATE: 20-May-09  
 TESTED BY: KG

LOADING RATE: 0.04 in./min.  
 TRACKING CODE: 5846\_US

MOISTURE CONTENT (Dry Basis)	
1. MOISTURE TIN NO.	0301-008
2. WT MOISTURE TIN (tare weight)	66.28 g
3. WT WET SOIL + TARE	114.66 g
4. WT DRY SOIL + TARE	101.35 g
5. WT WATER, Ww	13.31 g
6. WT DRY SOIL, Ws	35.07 g
7. MOISTURE CONTENT, W	37.95 %

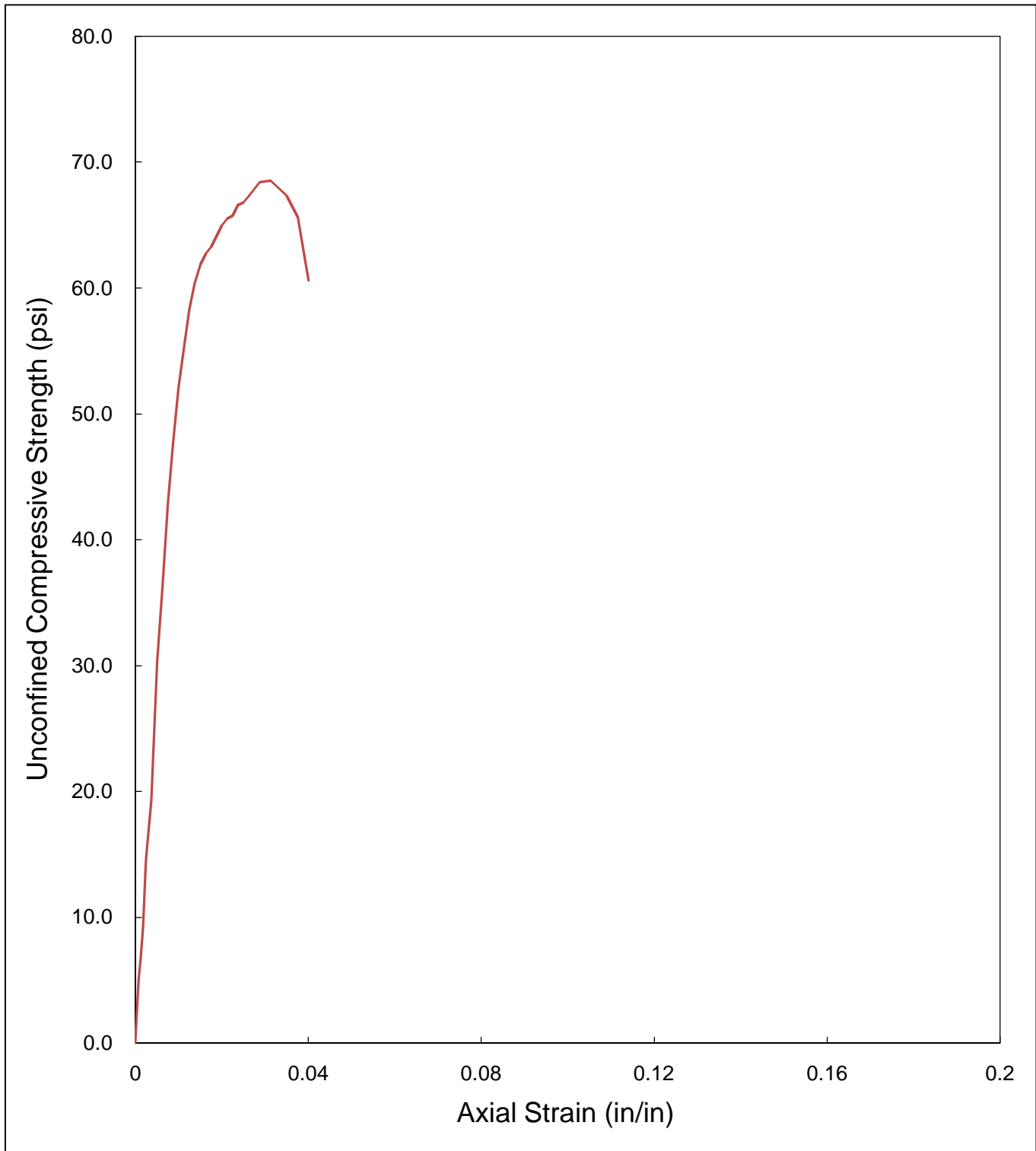
SOIL SPECIMEN DIMENSIONS		
	DIAMETER	LENGTH
No. 1	1.99 in.	4.00 in.
No. 2	1.98 in.	4.00 in.
No. 3	2.04 in.	3.99 in.
Average	2.00 in.	4.00 in.

SPECIMEN CONDITIONS	
Initial Specimen WT, Wo	371.02 g
Initial Area, Ao	3.15 in <sup>2</sup>
Initial Volume, Vo	12.60 in <sup>3</sup>
Initial Bulk Unit Weight,	112.2 lb/ft <sup>3</sup>
Initial Dry Unit Weight	81.3 lb/ft <sup>3</sup>
15 % Strain (0.15 Lo)	0.60 in.
UCS	68.5 lb/in <sup>2</sup>

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in <sup>2</sup> )	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in <sup>2</sup> )
0	0.000	0.000	3.152	0.0000	0.0
16	0.003	0.003	3.154	0.0008	5.1
21	0.005	0.005	3.156	0.0013	6.7
29	0.007	0.007	3.158	0.0018	9.2
46	0.010	0.010	3.160	0.0025	14.6
61	0.015	0.015	3.164	0.0038	19.3
96	0.020	0.020	3.168	0.0050	30.3
115	0.025	0.025	3.172	0.0063	36.3
136	0.030	0.030	3.176	0.0075	42.8
152	0.035	0.035	3.180	0.0088	47.8
166	0.040	0.040	3.184	0.0100	52.1
176	0.045	0.045	3.188	0.0113	55.2
186	0.050	0.050	3.192	0.0125	58.3
193	0.055	0.055	3.196	0.0138	60.4
198	0.060	0.060	3.200	0.0150	61.9
201	0.065	0.065	3.204	0.0163	62.7
203	0.070	0.070	3.208	0.0175	63.3
206	0.075	0.075	3.212	0.0188	64.1
209	0.080	0.080	3.216	0.0200	65.0
211	0.085	0.085	3.221	0.0213	65.5
212	0.090	0.090	3.225	0.0225	65.7
215	0.095	0.095	3.229	0.0238	66.6
216	0.100	0.100	3.233	0.0250	66.8
218	0.105	0.105	3.237	0.0263	67.3
220	0.110	0.110	3.241	0.0275	67.9
222	0.115	0.115	3.245	0.0288	68.4
223	0.125	0.125	3.254	0.0313	68.5
222	0.130	0.130	3.258	0.0325	68.1
220	0.140	0.140	3.266	0.0350	67.4
215	0.150	0.150	3.275	0.0375	65.6
199	0.160	0.160	3.284	0.0400	60.6

# UNCONFINED COMPRESSION TESTING

Sample No. 0301-008 (14-Day)





# UNCONFINED COMPRESSION TEST

ASTM D 2166

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-008 (14-Day)  
TESTING DATE: 5/20/2009  
TESTED BY: KG

LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5846\_US

TESTING PARAMETER AND RESULTS	
MOISTURE CONTENT	38.0 %
BULK UNIT WEIGHT	112.2 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	81.3 lb/ft <sup>3</sup>
UCS *	68.5 lb/in <sup>2</sup>

\* UCS - UNCONFINED COMPRESSIVE STRENGTH

# UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT: Norwich MGP  
 PROJECT No.: SE-0301  
 SAMPLE No.: 0301-008 (28 day)  
 TESTING DATE: 3-Jun-09  
 TESTED BY: KG

LOADING RATE: 0.04 in./min.  
 TRACKING CODE: 5906\_US

MOISTURE CONTENT (Dry Basis)	
1. MOISTURE TIN NO.	0301-008
2. WT MOISTURE TIN (tare weight)	69.77 g
3. WT WET SOIL + TARE	112.03 g
4. WT DRY SOIL + TARE	100.70 g
5. WT WATER, Ww	11.33 g
6. WT DRY SOIL, Ws	30.93 g
7. MOISTURE CONTENT, W	36.63 %

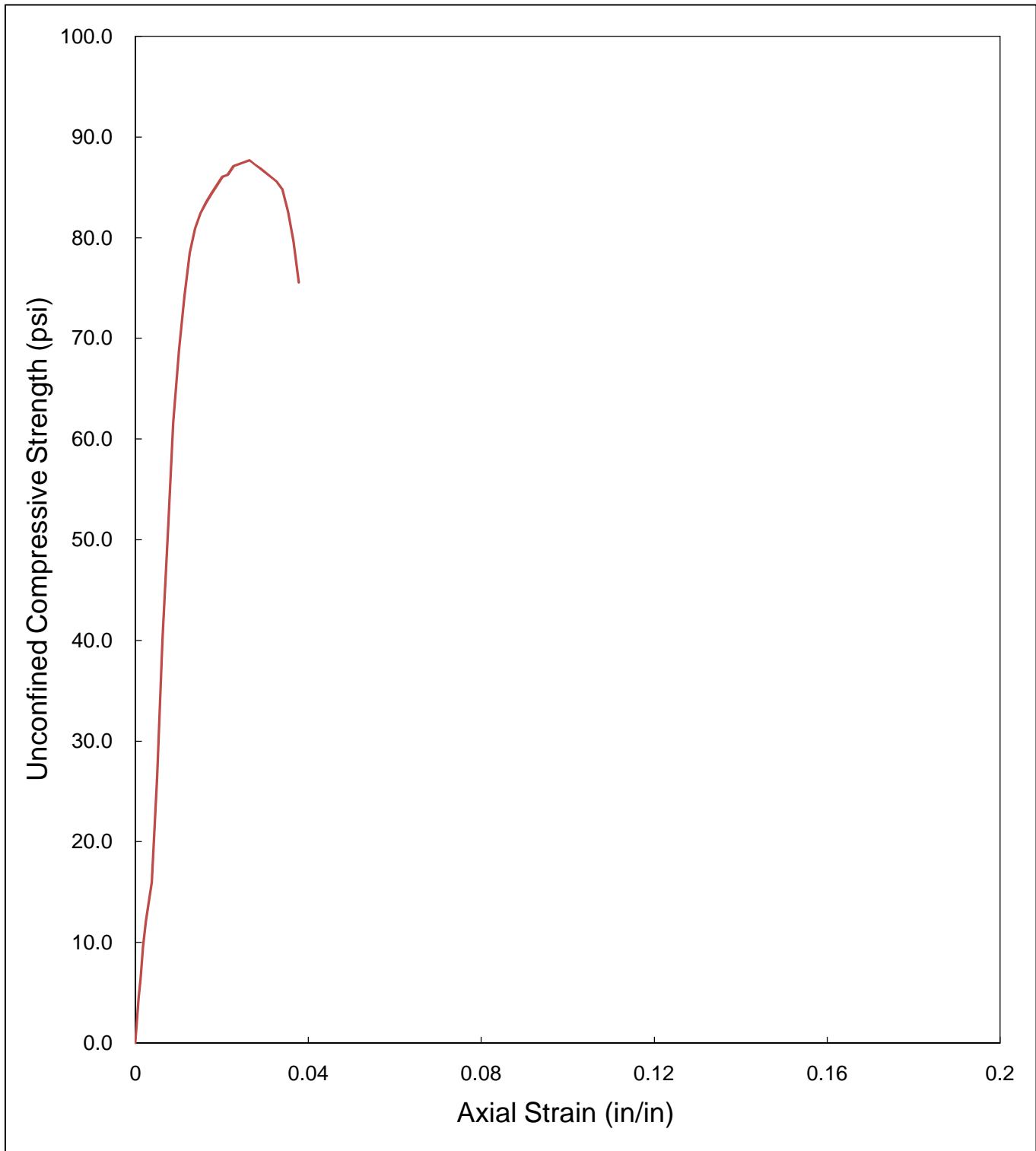
SOIL SPECIMEN DIMENSIONS		
	DIAMETER	LENGTH
No. 1	2.00 in.	3.99 in.
No. 2	1.99 in.	3.98 in.
No. 3	1.99 in.	3.95 in.
Average	1.99 in.	3.97 in.

SPECIMEN CONDITIONS	
Initial Specimen WT, Wo	370.81 g
Initial Area, Ao	3.12 in <sup>2</sup>
Initial Volume, Vo	12.40 in <sup>3</sup>
Initial Bulk Unit Weight,	113.9 lb/ft <sup>3</sup>
Initial Dry Unit Weight	83.4 lb/ft <sup>3</sup>
15 % Strain (0.15 Lo)	0.60 in.
UCS	87.7 lb/in <sup>2</sup>

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in <sup>2</sup> )	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in <sup>2</sup> )
0	0.000	0.000	3.121	0.0000	0.0
14	0.003	0.003	3.123	0.0008	4.5
20	0.005	0.005	3.125	0.0013	6.4
30	0.007	0.007	3.126	0.0018	9.6
38	0.010	0.010	3.129	0.0025	12.1
50	0.015	0.015	3.133	0.0038	16.0
83	0.020	0.020	3.136	0.0050	26.5
126	0.025	0.025	3.140	0.0063	40.1
159	0.030	0.030	3.144	0.0076	50.6
194	0.035	0.035	3.148	0.0088	61.6
217	0.040	0.040	3.152	0.0101	68.8
234	0.045	0.045	3.156	0.0113	74.1
248	0.050	0.050	3.160	0.0126	78.5
256	0.055	0.055	3.164	0.0138	80.9
261	0.060	0.060	3.169	0.0151	82.4
265	0.065	0.065	3.173	0.0164	83.5
268	0.070	0.070	3.177	0.0176	84.4
271	0.075	0.075	3.181	0.0189	85.2
274	0.080	0.080	3.185	0.0201	86.0
275	0.085	0.085	3.189	0.0214	86.2
278	0.090	0.090	3.193	0.0227	87.1
279	0.095	0.095	3.197	0.0239	87.3
280	0.100	0.100	3.201	0.0252	87.5
281	0.105	0.105	3.205	0.0264	87.7
280	0.110	0.110	3.210	0.0277	87.2
279	0.115	0.115	3.214	0.0289	86.8
276	0.130	0.130	3.226	0.0327	85.5
274	0.135	0.135	3.230	0.0340	84.8
267	0.140	0.140	3.235	0.0352	82.5
258	0.145	0.145	3.239	0.0365	79.7
245	0.150	0.150	3.243	0.0378	75.5
230	0.155	0.155	3.247	0.0390	70.8
215	0.160	0.160	3.252	0.0403	66.1
197	0.165	0.165	3.256	0.0415	60.5
170	0.170	0.170	3.260	0.0428	52.1

# UNCONFINED COMPRESSION TESTING

Sample No. 0301-008 (28 day)



# UNCONFINED COMPRESSION TEST

ASTM D 2166

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-008 (28 day)  
TESTING DATE: 6/3/2009  
TESTED BY: KG

LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5906\_US

TESTING PARAMETER AND RESULTS	
MOISTURE CONTENT	36.6 %
BULK UNIT WEIGHT	113.9 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	83.4 lb/ft <sup>3</sup>
UCS *	87.7 lb/in <sup>2</sup>

\* UCS - UNCONFINED COMPRESSIVE STRENGTH

# UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT: Norwich MGP  
 PROJECT No.: SE-0301  
 SAMPLE No.: 0301-009 (7-Day)  
 TESTING DATE: 13-May-09  
 TESTED BY: RSL

LOADING RATE: 0.04 in./min.  
 TRACKING CODE: 5824\_US

MOISTURE CONTENT (Dry Basis)	
1. MOISTURE TIN NO.	0301-009
2. WT MOISTURE TIN (tare weight)	70.80 g
3. WT WET SOIL + TARE	135.09 g
4. WT DRY SOIL + TARE	118.70 g
5. WT WATER, Ww	16.39 g
6. WT DRY SOIL, Ws	47.90 g
7. MOISTURE CONTENT, W	34.22 %

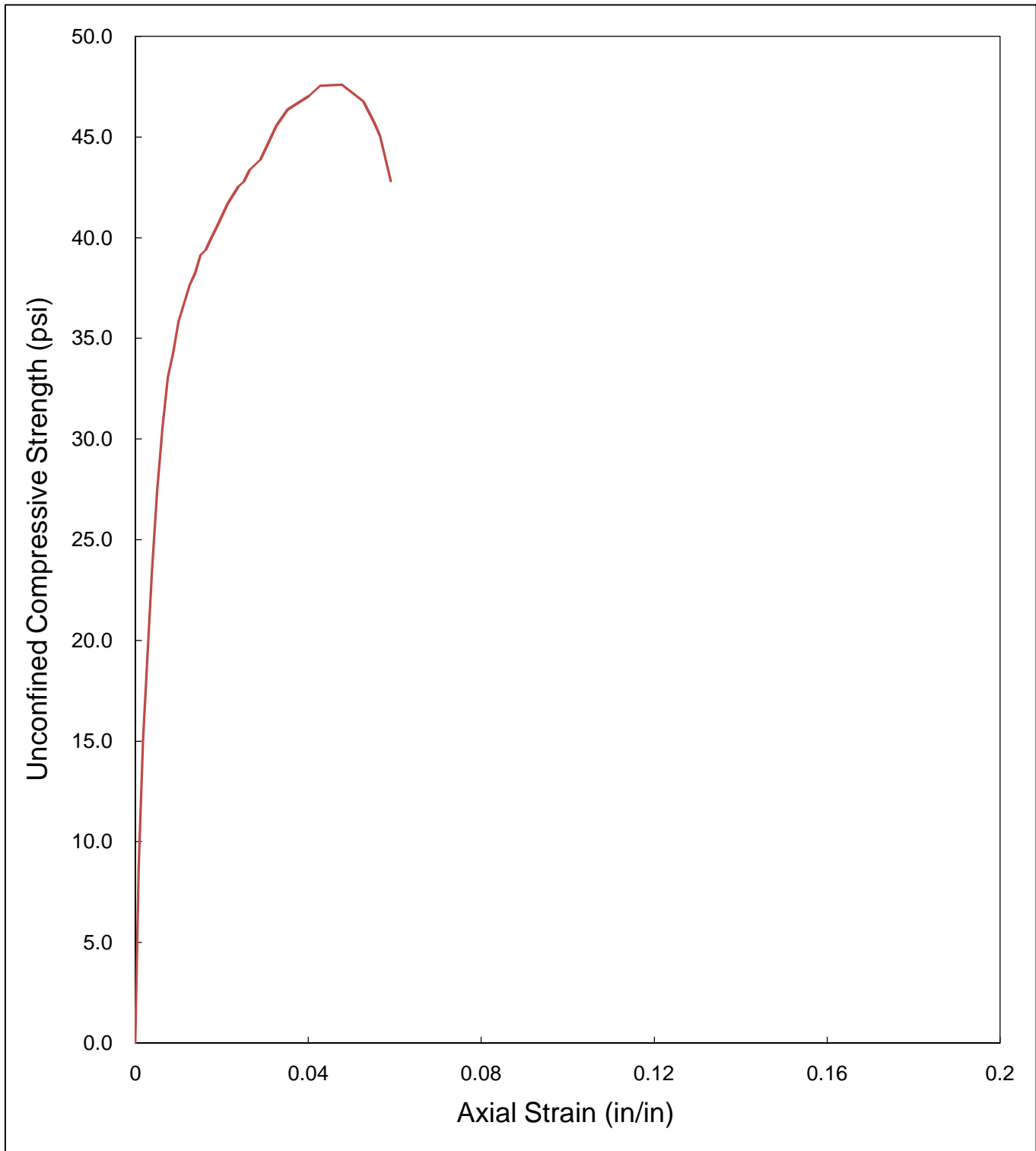
SOIL SPECIMEN DIMENSIONS		
	DIAMETER	LENGTH
No. 1	2.01 in.	3.96 in.
No. 2	1.98 in.	3.99 in.
No. 3	1.99 in.	3.98 in.
Average	1.99 in.	3.98 in.

SPECIMEN CONDITIONS	
Initial Specimen WT, Wo	374.08 g
Initial Area, Ao	3.12 in <sup>2</sup>
Initial Volume, Vo	12.41 in <sup>3</sup>
Initial Bulk Unit Weight,	114.8 lb/ft <sup>3</sup>
Initial Dry Unit Weight	85.6 lb/ft <sup>3</sup>
15 % Strain (0.15 Lo)	0.60 in.
UCS	47.6 lb/in <sup>2</sup>

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in <sup>2</sup> )	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in <sup>2</sup> )
0	0.000	0.000	3.121	0.0000	0.0
27	0.003	0.003	3.123	0.0008	8.6
36	0.005	0.005	3.125	0.0013	11.5
47	0.007	0.007	3.126	0.0018	15.0
73	0.015	0.015	3.132	0.0038	23.3
86	0.020	0.020	3.136	0.0050	27.4
96	0.025	0.025	3.140	0.0063	30.6
104	0.030	0.030	3.144	0.0075	33.1
108	0.035	0.035	3.148	0.0088	34.3
113	0.040	0.040	3.152	0.0101	35.8
119	0.050	0.050	3.160	0.0126	37.7
121	0.055	0.055	3.164	0.0138	38.2
124	0.060	0.060	3.168	0.0151	39.1
125	0.065	0.065	3.173	0.0163	39.4
127	0.070	0.070	3.177	0.0176	40.0
129	0.075	0.075	3.181	0.0189	40.6
133	0.085	0.085	3.189	0.0214	41.7
136	0.095	0.095	3.197	0.0239	42.5
137	0.100	0.100	3.201	0.0251	42.8
139	0.105	0.105	3.205	0.0264	43.4
141	0.115	0.115	3.214	0.0289	43.9
143	0.120	0.120	3.218	0.0302	44.4
147	0.130	0.130	3.226	0.0327	45.6
150	0.140	0.140	3.235	0.0352	46.4
153	0.160	0.160	3.252	0.0402	47.1
155	0.170	0.170	3.260	0.0427	47.5
156	0.190	0.190	3.277	0.0478	47.6
154	0.210	0.210	3.295	0.0528	46.7
151	0.220	0.220	3.303	0.0553	45.7
149	0.225	0.225	3.308	0.0566	45.0
142	0.235	0.235	3.317	0.0591	42.8

# UNCONFINED COMPRESSION TESTING

Sample No. 0301-009 (7-Day)



# UNCONFINED COMPRESSION TEST

ASTM D 2166

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-009 (7-Day)  
TESTING DATE: 5/13/2009  
TESTED BY: RSL

LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5824\_US

TESTING PARAMETER AND RESULTS	
MOISTURE CONTENT	34.2 %
BULK UNIT WEIGHT	114.8 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	85.6 lb/ft <sup>3</sup>
UCS *	47.6 lb/in <sup>2</sup>

\* UCS - UNCONFINED COMPRESSIVE STRENGTH

# UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT: Norwich MGP  
 PROJECT No.: SE-0301  
 SAMPLE No.: 0301-009 (14-Day)  
 TESTING DATE: 20-May-09  
 TESTED BY: KG

LOADING RATE: 0.04 in./min.  
 TRACKING CODE: 5847\_US

MOISTURE CONTENT (Dry Basis)	
1. MOISTURE TIN NO.	0301-009
2. WT MOISTURE TIN (tare weight)	85.97 g
3. WT WET SOIL + TARE	145.15 g
4. WT DRY SOIL + TARE	129.61 g
5. WT WATER, Ww	15.54 g
6. WT DRY SOIL, Ws	43.64 g
7. MOISTURE CONTENT, W	35.61 %

SOIL SPECIMEN DIMENSIONS		
	DIAMETER	LENGTH
No. 1	1.98 in.	4.02 in.
No. 2	2.02 in.	3.98 in.
No. 3	2.02 in.	4.01 in.
Average	2.01 in.	4.00 in.

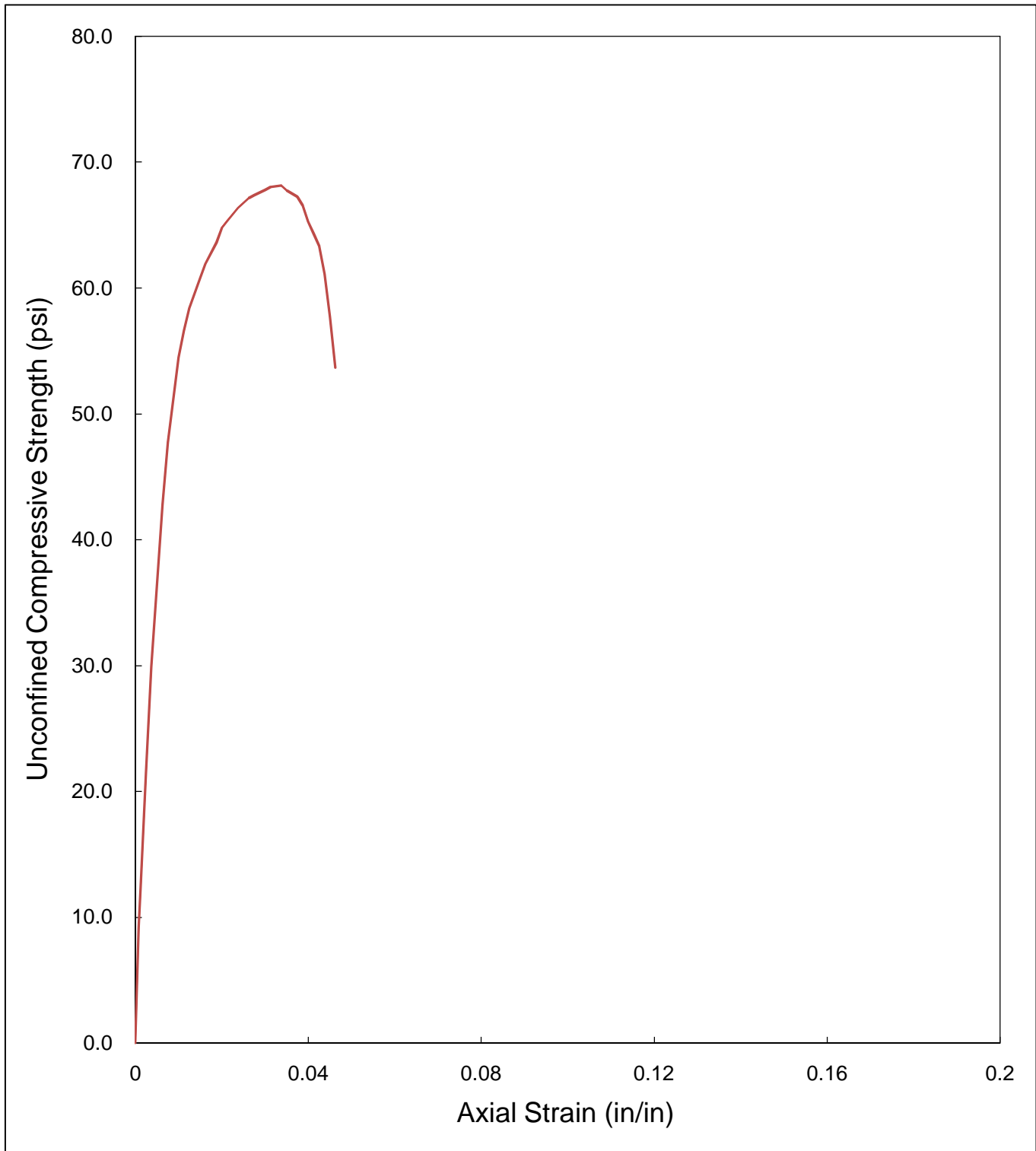
SPECIMEN CONDITIONS	
Initial Specimen WT, Wo	378.00 g
Initial Area, Ao	3.16 in <sup>2</sup>
Initial Volume, Vo	12.66 in <sup>3</sup>
Initial Bulk Unit Weight,	113.7 lb/ft <sup>3</sup>
Initial Dry Unit Weight	83.9 lb/ft <sup>3</sup>
15 % Strain (0.15 Lo)	0.60 in.
UCS	68.1 lb/in <sup>2</sup>

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in <sup>2</sup> )	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in <sup>2</sup> )
0	0.000	0.000	3.163	0.0000	0.0
29	0.003	0.003	3.165	0.0007	9.2
39	0.005	0.005	3.167	0.0012	12.3
68	0.010	0.010	3.170	0.0025	21.4
95	0.015	0.015	3.174	0.0037	29.9
136	0.025	0.025	3.182	0.0062	42.7
152	0.030	0.030	3.186	0.0075	47.7
174	0.040	0.040	3.194	0.0100	54.5
181	0.045	0.045	3.199	0.0112	56.6
187	0.050	0.050	3.203	0.0125	58.4
195	0.060	0.060	3.211	0.0150	60.7
199	0.065	0.065	3.215	0.0162	61.9
205	0.075	0.075	3.223	0.0187	63.6
209	0.080	0.080	3.227	0.0200	64.8
211	0.085	0.085	3.231	0.0212	65.3
215	0.095	0.095	3.239	0.0237	66.4
218	0.105	0.105	3.248	0.0262	67.1
219	0.110	0.110	3.252	0.0275	67.3
221	0.120	0.120	3.260	0.0300	67.8
222	0.125	0.125	3.265	0.0312	68.0
223	0.135	0.135	3.273	0.0337	68.1
222	0.140	0.140	3.277	0.0350	67.7
221	0.150	0.150	3.286	0.0375	67.3
219	0.155	0.155	3.290	0.0387	66.6
215	0.160	0.160	3.294	0.0400	65.3
212	0.165	0.165	3.299	0.0412	64.3
209	0.170	0.170	3.303	0.0425	63.3
202	0.175	0.175	3.307	0.0437	61.1
191	0.180	0.180	3.311	0.0450	57.7
178	0.185	0.185	3.316	0.0462	53.7



# UNCONFINED COMPRESSION TESTING

Sample No. 0301-009 (14-Day)



# UNCONFINED COMPRESSION TEST

ASTM D 2166

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-009 (14-Day)  
TESTING DATE: 5/20/2009  
TESTED BY: KG

LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5847\_US

TESTING PARAMETER AND RESULTS	
MOISTURE CONTENT	35.6 %
BULK UNIT WEIGHT	113.7 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	83.9 lb/ft <sup>3</sup>
UCS *	68.1 lb/in <sup>2</sup>

\* UCS - UNCONFINED COMPRESSIVE STRENGTH

# UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT: Norwich MGP  
 PROJECT No.: SE-0301  
 SAMPLE No.: 0301-009 (28 day)  
 TESTING DATE: 3-Jun-09  
 TESTED BY: KG

LOADING RATE: 0.04 in./min.  
 TRACKING CODE: 5907\_US

MOISTURE CONTENT (Dry Basis)	
1. MOISTURE TIN NO.	0301-009
2. WT MOISTURE TIN (tare weight)	84.73 g
3. WT WET SOIL + TARE	111.96 g
4. WT DRY SOIL + TARE	105.13 g
5. WT WATER, Ww	6.83 g
6. WT DRY SOIL, Ws	20.40 g
7. MOISTURE CONTENT, W	33.48 %

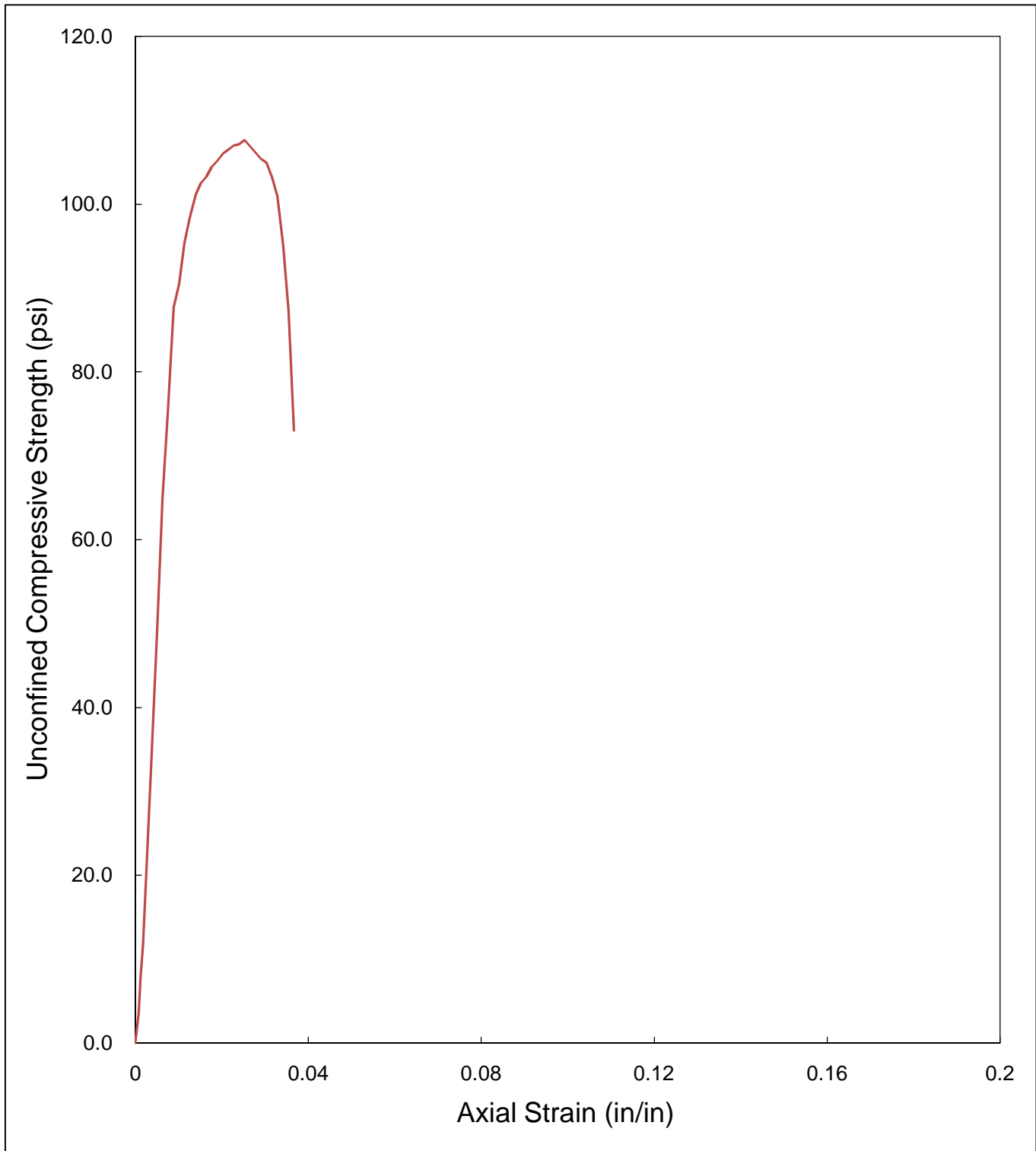
SOIL SPECIMEN DIMENSIONS		
	DIAMETER	LENGTH
No. 1	1.99 in.	3.97 in.
No. 2	2.01 in.	3.95 in.
No. 3	2.01 in.	3.95 in.
Average	2.00 in.	3.96 in.

SPECIMEN CONDITIONS	
Initial Specimen WT, Wo	375.31 g
Initial Area, Ao	3.15 in <sup>2</sup>
Initial Volume, Vo	12.47 in <sup>3</sup>
Initial Bulk Unit Weight,	114.6 lb/ft <sup>3</sup>
Initial Dry Unit Weight	85.9 lb/ft <sup>3</sup>
15 % Strain (0.15 Lo)	0.59 in.
UCS	107.6 lb/in <sup>2</sup>

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in <sup>2</sup> )	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in <sup>2</sup> )
0	0.000	0.000	3.152	0.0000	0.0
11	0.003	0.003	3.154	0.0008	3.5
25	0.005	0.005	3.156	0.0013	7.9
37	0.007	0.007	3.158	0.0018	11.7
61	0.010	0.010	3.160	0.0025	19.3
110	0.015	0.015	3.164	0.0038	34.8
156	0.020	0.020	3.168	0.0051	49.2
206	0.025	0.025	3.172	0.0063	64.9
239	0.030	0.030	3.176	0.0076	75.2
279	0.035	0.035	3.180	0.0088	87.7
288	0.040	0.040	3.184	0.0101	90.4
304	0.045	0.045	3.188	0.0114	95.3
314	0.050	0.050	3.192	0.0126	98.4
323	0.055	0.055	3.197	0.0139	101.0
328	0.060	0.060	3.201	0.0152	102.5
331	0.065	0.065	3.205	0.0164	103.3
335	0.070	0.070	3.209	0.0177	104.4
338	0.075	0.075	3.213	0.0190	105.2
341	0.080	0.080	3.217	0.0202	106.0
343	0.085	0.085	3.221	0.0215	106.5
345	0.090	0.090	3.225	0.0227	107.0
346	0.095	0.095	3.230	0.0240	107.1
348	0.100	0.100	3.234	0.0253	107.6
342	0.115	0.115	3.246	0.0291	105.3
341	0.120	0.120	3.251	0.0303	104.9
336	0.125	0.125	3.255	0.0316	103.2
329	0.130	0.130	3.259	0.0329	100.9
310	0.135	0.135	3.263	0.0341	95.0
285	0.140	0.140	3.268	0.0354	87.2
239	0.145	0.145	3.272	0.0366	73.0

# UNCONFINED COMPRESSION TESTING

Sample No. 0301-009 (28 day)



# UNCONFINED COMPRESSION TEST

ASTM D 2166

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-009 (28 day)  
TESTING DATE: 6/3/2009  
TESTED BY: KG

LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5907\_US

TESTING PARAMETER AND RESULTS	
MOISTURE CONTENT	33.5 %
BULK UNIT WEIGHT	114.6 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	85.9 lb/ft <sup>3</sup>
UCS *	107.6 lb/in <sup>2</sup>

\* UCS - UNCONFINED COMPRESSIVE STRENGTH

# UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT: Norwich MGP  
 PROJECT No.: SE-0301  
 SAMPLE No.: 0301-010 (7-Day)  
 TESTING DATE: 14-May-09  
 TESTED BY: SEM

LOADING RATE: 0.04 in./min.  
 TRACKING CODE: 5828\_US

MOISTURE CONTENT (Dry Basis)	
1. MOISTURE TIN NO.	0301-010
2. WT MOISTURE TIN (tare weight)	70.24 g
3. WT WET SOIL + TARE	152.52 g
4. WT DRY SOIL + TARE	130.61 g
5. WT WATER, Ww	21.91 g
6. WT DRY SOIL, Ws	60.37 g
7. MOISTURE CONTENT, W	36.29 %

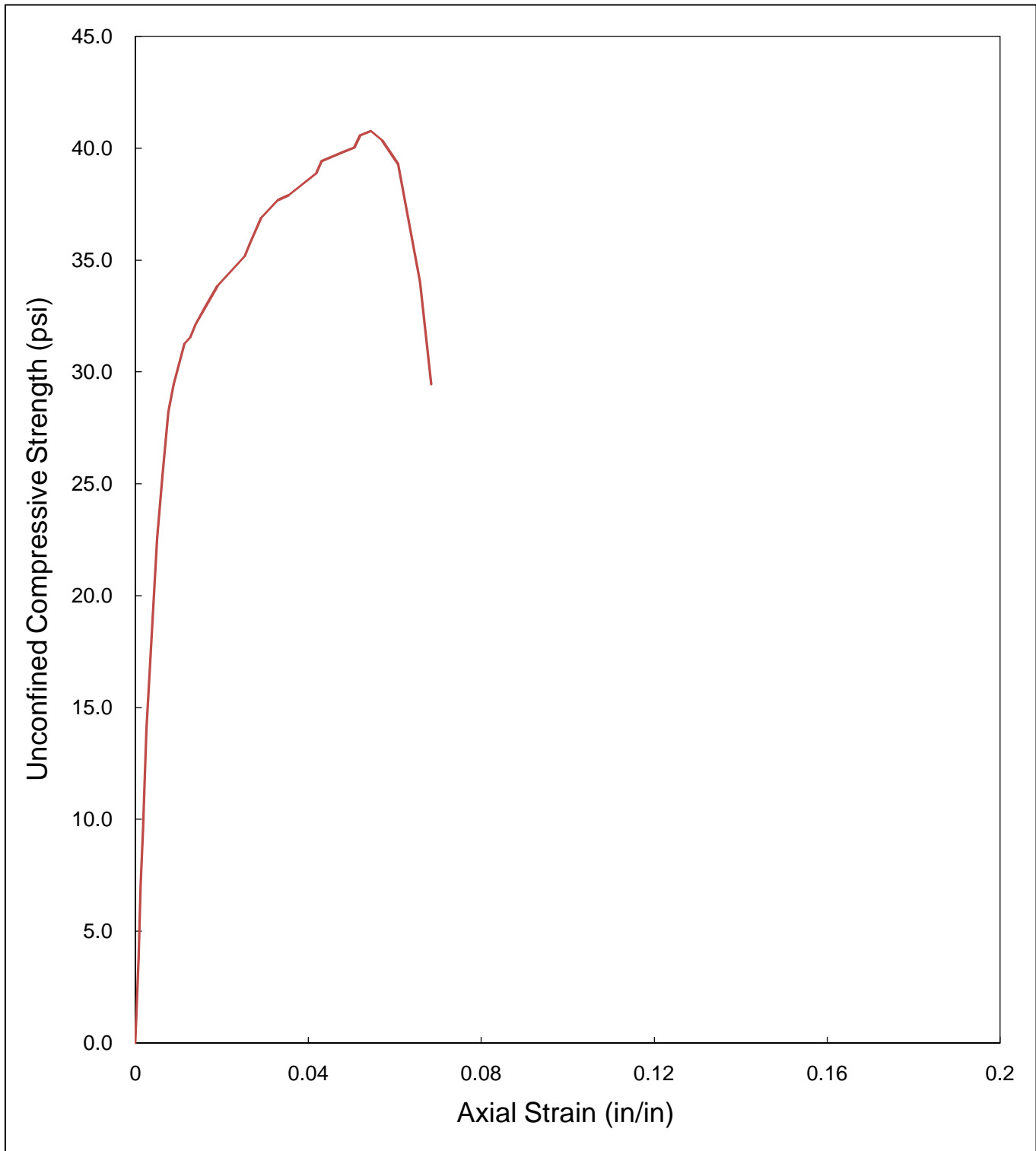
SOIL SPECIMEN DIMENSIONS		
	DIAMETER	LENGTH
No. 1	1.98 in.	3.94 in.
No. 2	2.00 in.	3.95 in.
No. 3	2.01 in.	3.95 in.
Average	2.00 in.	3.95 in.

SPECIMEN CONDITIONS	
Initial Specimen WT, Wo	374.59 g
Initial Area, Ao	3.13 in <sup>2</sup>
Initial Volume, Vo	12.36 in <sup>3</sup>
Initial Bulk Unit Weight,	115.5 lb/ft <sup>3</sup>
Initial Dry Unit Weight	84.7 lb/ft <sup>3</sup>
15 % Strain (0.15 Lo)	0.59 in.
UCS	40.8 lb/in <sup>2</sup>

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in <sup>2</sup> )	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in <sup>2</sup> )
0	0.000	0.000	3.131	0.0000	0.0
12	0.003	0.003	3.134	0.0008	3.8
22	0.005	0.005	3.135	0.0013	7.0
30	0.007	0.007	3.137	0.0018	9.6
44	0.010	0.010	3.139	0.0025	14.0
71	0.020	0.020	3.147	0.0051	22.6
80	0.025	0.025	3.151	0.0063	25.4
89	0.030	0.030	3.155	0.0076	28.2
93	0.035	0.035	3.159	0.0089	29.4
99	0.045	0.045	3.167	0.0114	31.3
100	0.050	0.050	3.171	0.0127	31.5
102	0.055	0.055	3.175	0.0139	32.1
105	0.065	0.065	3.184	0.0165	33.0
108	0.075	0.075	3.192	0.0190	33.8
109	0.080	0.080	3.196	0.0203	34.1
111	0.090	0.090	3.204	0.0228	34.6
113	0.100	0.100	3.213	0.0253	35.2
115	0.105	0.105	3.217	0.0266	35.8
119	0.115	0.115	3.225	0.0291	36.9
122	0.130	0.130	3.238	0.0329	37.7
123	0.140	0.140	3.246	0.0355	37.9
127	0.165	0.165	3.268	0.0418	38.9
129	0.170	0.170	3.272	0.0431	39.4
131	0.190	0.190	3.289	0.0481	39.8
132	0.200	0.200	3.298	0.0507	40.0
134	0.205	0.205	3.303	0.0519	40.6
135	0.215	0.215	3.312	0.0545	40.8
134	0.225	0.225	3.320	0.0570	40.4
131	0.240	0.240	3.334	0.0608	39.3
114	0.260	0.260	3.352	0.0659	34.0
99	0.270	0.270	3.361	0.0684	29.5

# UNCONFINED COMPRESSION TESTING

Sample No. 0301-010 (7-Day)



# UNCONFINED COMPRESSION TEST

ASTM D 2166

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-010 (7-Day)  
TESTING DATE: 5/14/2009  
TESTED BY: SEM

LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5828\_US

TESTING PARAMETER AND RESULTS	
MOISTURE CONTENT	36.3 %
BULK UNIT WEIGHT	115.5 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	84.7 lb/ft <sup>3</sup>
UCS *	40.8 lb/in <sup>2</sup>

\* UCS - UNCONFINED COMPRESSIVE STRENGTH



# UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT: Norwich MGP  
 PROJECT No.: SE-0301  
 SAMPLE No.: 0301-010 (14-Day)  
 TESTING DATE: 21-May-09  
 TESTED BY: SEM

LOADING RATE: 0.04 in./min.  
 TRACKING CODE: 5859\_US

MOISTURE CONTENT (Dry Basis)	
1. MOISTURE TIN NO.	0301-010
2. WT MOISTURE TIN (tare weight)	66.52 g
3. WT WET SOIL + TARE	159.44 g
4. WT DRY SOIL + TARE	134.94 g
5. WT WATER, Ww	24.50 g
6. WT DRY SOIL, Ws	68.42 g
7. MOISTURE CONTENT, W	35.81 %

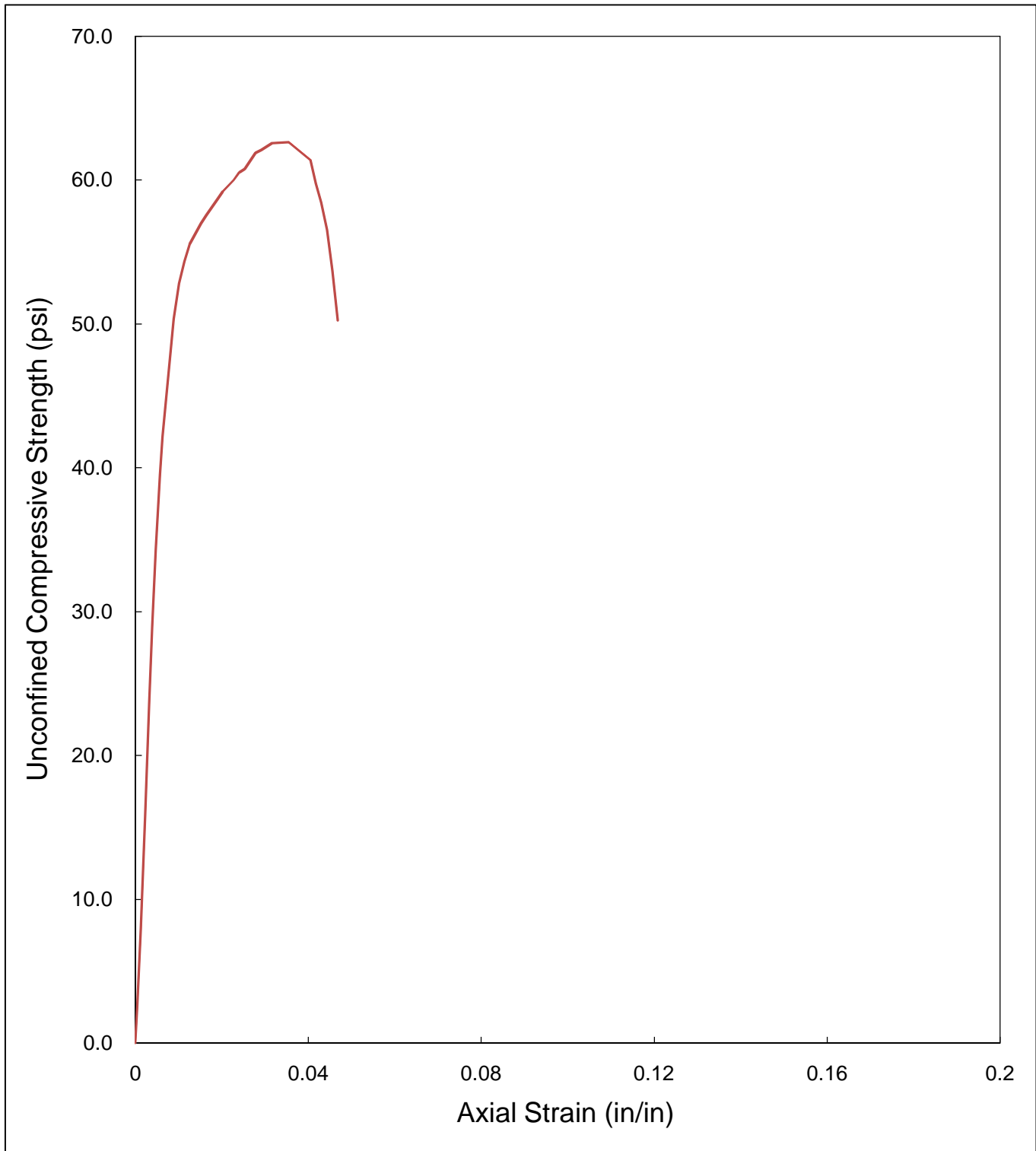
SOIL SPECIMEN DIMENSIONS		
	DIAMETER	LENGTH
No. 1	1.98 in.	3.95 in.
No. 2	1.99 in.	3.95 in.
No. 3	2.00 in.	3.95 in.
Average	1.99 in.	3.95 in.

SPECIMEN CONDITIONS	
Initial Specimen WT, Wo	373.55 g
Initial Area, Ao	3.11 in <sup>2</sup>
Initial Volume, Vo	12.29 in <sup>3</sup>
Initial Bulk Unit Weight,	115.8 lb/ft <sup>3</sup>
Initial Dry Unit Weight	85.3 lb/ft <sup>3</sup>
15 % Strain (0.15 Lo)	0.59 in.
UCS	62.6 lb/in <sup>2</sup>

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in <sup>2</sup> )	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in <sup>2</sup> )
0	0.000	0.000	3.110	0.0000	0.0
14	0.003	0.003	3.113	0.0008	4.5
23	0.005	0.005	3.114	0.0013	7.4
38	0.007	0.007	3.116	0.0018	12.2
88	0.015	0.015	3.122	0.0038	28.2
113	0.020	0.020	3.126	0.0051	36.1
132	0.025	0.025	3.130	0.0063	42.2
158	0.035	0.035	3.138	0.0089	50.3
166	0.040	0.040	3.142	0.0101	52.8
171	0.045	0.045	3.146	0.0114	54.4
175	0.050	0.050	3.150	0.0127	55.6
180	0.060	0.060	3.158	0.0152	57.0
182	0.065	0.065	3.162	0.0165	57.6
186	0.075	0.075	3.170	0.0190	58.7
188	0.080	0.080	3.175	0.0203	59.2
191	0.090	0.090	3.183	0.0228	60.0
193	0.095	0.095	3.187	0.0241	60.6
194	0.100	0.100	3.191	0.0253	60.8
198	0.110	0.110	3.199	0.0278	61.9
199	0.115	0.115	3.204	0.0291	62.1
200	0.120	0.120	3.208	0.0304	62.3
201	0.125	0.125	3.212	0.0316	62.6
202	0.140	0.140	3.225	0.0354	62.6
199	0.160	0.160	3.242	0.0405	61.4
194	0.165	0.165	3.246	0.0418	59.8
190	0.170	0.170	3.250	0.0430	58.5
184	0.175	0.175	3.254	0.0443	56.5
175	0.180	0.180	3.259	0.0456	53.7
164	0.185	0.185	3.263	0.0468	50.3

# UNCONFINED COMPRESSION TESTING

Sample No. 0301-010 (14-Day)



# UNCONFINED COMPRESSION TEST

ASTM D 2166

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-010 (14-Day)  
TESTING DATE: 5/21/2009  
TESTED BY: SEM

LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5859\_US

TESTING PARAMETER AND RESULTS	
MOISTURE CONTENT	35.8 %
BULK UNIT WEIGHT	115.8 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	85.3 lb/ft <sup>3</sup>
UCS *	62.6 lb/in <sup>2</sup>

\* UCS - UNCONFINED COMPRESSIVE STRENGTH

# UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT: Norwich MGP  
 PROJECT No.: SE-0301  
 SAMPLE No.: 0301-010 (28 day)  
 TESTING DATE: 4-Jun-09  
 TESTED BY: SEM

LOADING RATE: 0.04 in./min.  
 TRACKING CODE: 5911\_US

MOISTURE CONTENT (Dry Basis)	
1. MOISTURE TIN NO.	0301-010
2. WT MOISTURE TIN (tare weight)	111.76 g
3. WT WET SOIL + TARE	213.52 g
4. WT DRY SOIL + TARE	186.87 g
5. WT WATER, Ww	26.65 g
6. WT DRY SOIL, Ws	75.11 g
7. MOISTURE CONTENT, W	35.48 %

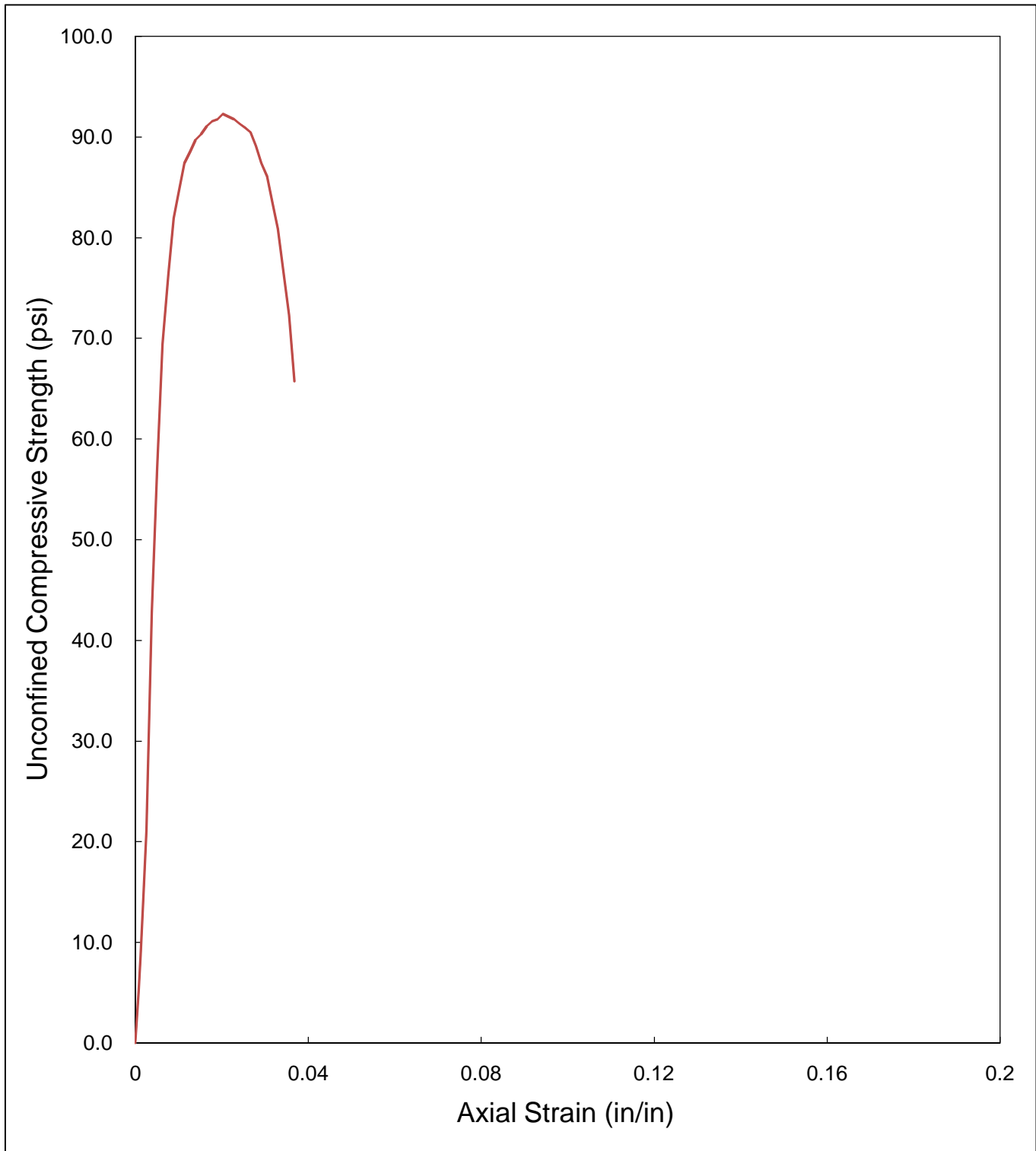
SOIL SPECIMEN DIMENSIONS		
	DIAMETER	LENGTH
No. 1	1.98 in.	3.94 in.
No. 2	2.00 in.	3.94 in.
No. 3	2.00 in.	3.94 in.
Average	1.99 in.	3.94 in.

SPECIMEN CONDITIONS	
Initial Specimen WT, Wo	371.14 g
Initial Area, Ao	3.12 in <sup>2</sup>
Initial Volume, Vo	12.30 in <sup>3</sup>
Initial Bulk Unit Weight,	115.0 lb/ft <sup>3</sup>
Initial Dry Unit Weight	84.9 lb/ft <sup>3</sup>
15 % Strain (0.15 Lo)	0.59 in.
UCS	92.3 lb/in <sup>2</sup>

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in <sup>2</sup> )	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in <sup>2</sup> )
0	0.000	0.000	3.121	0.0000	0.0
16	0.003	0.003	3.123	0.0008	5.1
27	0.005	0.005	3.125	0.0013	8.6
43	0.007	0.007	3.126	0.0018	13.8
66	0.010	0.010	3.129	0.0025	21.1
134	0.015	0.015	3.133	0.0038	42.8
179	0.020	0.020	3.137	0.0051	57.1
218	0.025	0.025	3.141	0.0063	69.4
240	0.030	0.030	3.145	0.0076	76.3
258	0.035	0.035	3.149	0.0089	81.9
267	0.040	0.040	3.153	0.0102	84.7
276	0.045	0.045	3.157	0.0114	87.4
280	0.050	0.050	3.161	0.0127	88.6
284	0.055	0.055	3.165	0.0140	89.7
286	0.060	0.060	3.169	0.0152	90.3
289	0.065	0.065	3.173	0.0165	91.1
291	0.070	0.070	3.177	0.0178	91.6
292	0.075	0.075	3.181	0.0190	91.8
294	0.080	0.080	3.185	0.0203	92.3
293	0.090	0.090	3.194	0.0228	91.7
292	0.095	0.095	3.198	0.0241	91.3
291	0.100	0.100	3.202	0.0254	90.9
290	0.105	0.105	3.206	0.0266	90.5
286	0.110	0.110	3.210	0.0279	89.1
281	0.115	0.115	3.215	0.0292	87.4
277	0.120	0.120	3.219	0.0305	86.1
269	0.125	0.125	3.223	0.0317	83.5
261	0.130	0.130	3.227	0.0330	80.9
248	0.135	0.135	3.231	0.0343	76.7
234	0.140	0.140	3.236	0.0355	72.3
213	0.145	0.145	3.240	0.0368	65.7

# UNCONFINED COMPRESSION TESTING

Sample No. 0301-010 (28 day)



# UNCONFINED COMPRESSION TEST

ASTM D 2166

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-010 (28 day)  
TESTING DATE: 6/4/2009  
TESTED BY: SEM

LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5911\_US

TESTING PARAMETER AND RESULTS	
MOISTURE CONTENT	35.5 %
BULK UNIT WEIGHT	115.0 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	84.9 lb/ft <sup>3</sup>
UCS *	92.3 lb/in <sup>2</sup>

\* UCS - UNCONFINED COMPRESSIVE STRENGTH

## ASTM D 2166

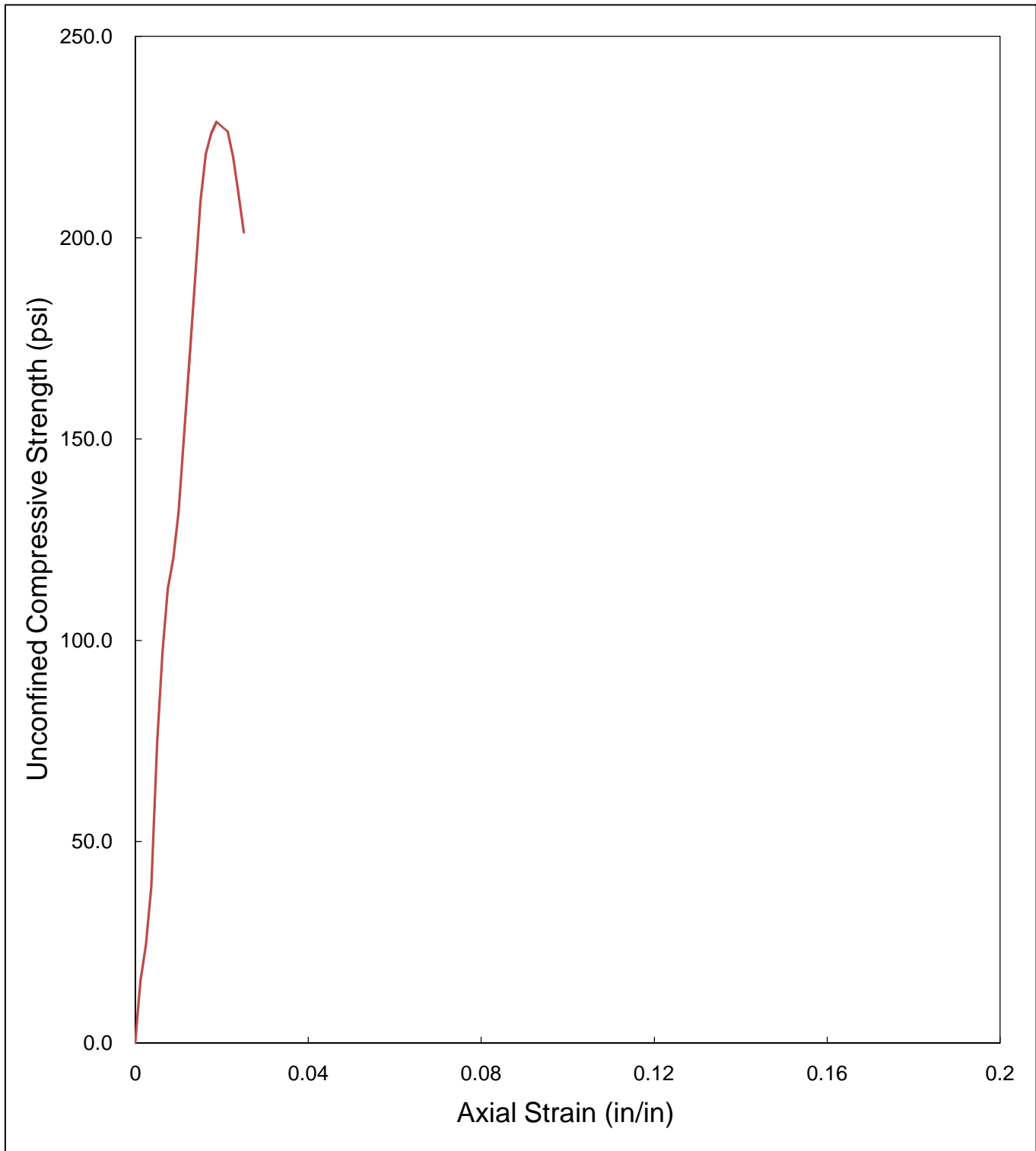
LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5811\_US

SOIL SPECIMEN DIMENSIONS		
	DIAMETER	LENGTH
No. 1	1.99 in.	4.00 in.
No. 2	1.99 in.	3.98 in.
No. 3	1.99 in.	3.98 in.
<b>Average</b>	<b>1.99 in.</b>	<b>3.99 in.</b>

[illegible]

# UNCONFINED COMPRESSION TESTING

Sample No. 0301-011 (7-Day)





# UNCONFINED COMPRESSION TEST

ASTM D 2166

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-011 (7-Day)  
TESTING DATE: 5/8/2009  
TESTED BY: RSL

LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5811\_US

TESTING PARAMETER AND RESULTS	
MOISTURE CONTENT	10.7 %
BULK UNIT WEIGHT	142.5 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	128.7 lb/ft <sup>3</sup>
UCS *	228.7 lb/in <sup>2</sup>

\* UCS - UNCONFINED COMPRESSIVE STRENGTH

# UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT: Norwich MGP  
 PROJECT No.: SE-0301  
 SAMPLE No.: 0301-011 (14-Day)  
 TESTING DATE: 15-May-09  
 TESTED BY: RSL

LOADING RATE: 0.04 in./min.  
 TRACKING CODE: 5832\_US

MOISTURE CONTENT (Dry Basis)	
1. MOISTURE TIN NO.	0301-011
2. WT MOISTURE TIN (tare weight)	70.73 g
3. WT WET SOIL + TARE	134.88 g
4. WT DRY SOIL + TARE	128.27 g
5. WT WATER, Ww	6.61 g
6. WT DRY SOIL, Ws	57.54 g
7. MOISTURE CONTENT, W	11.49 %

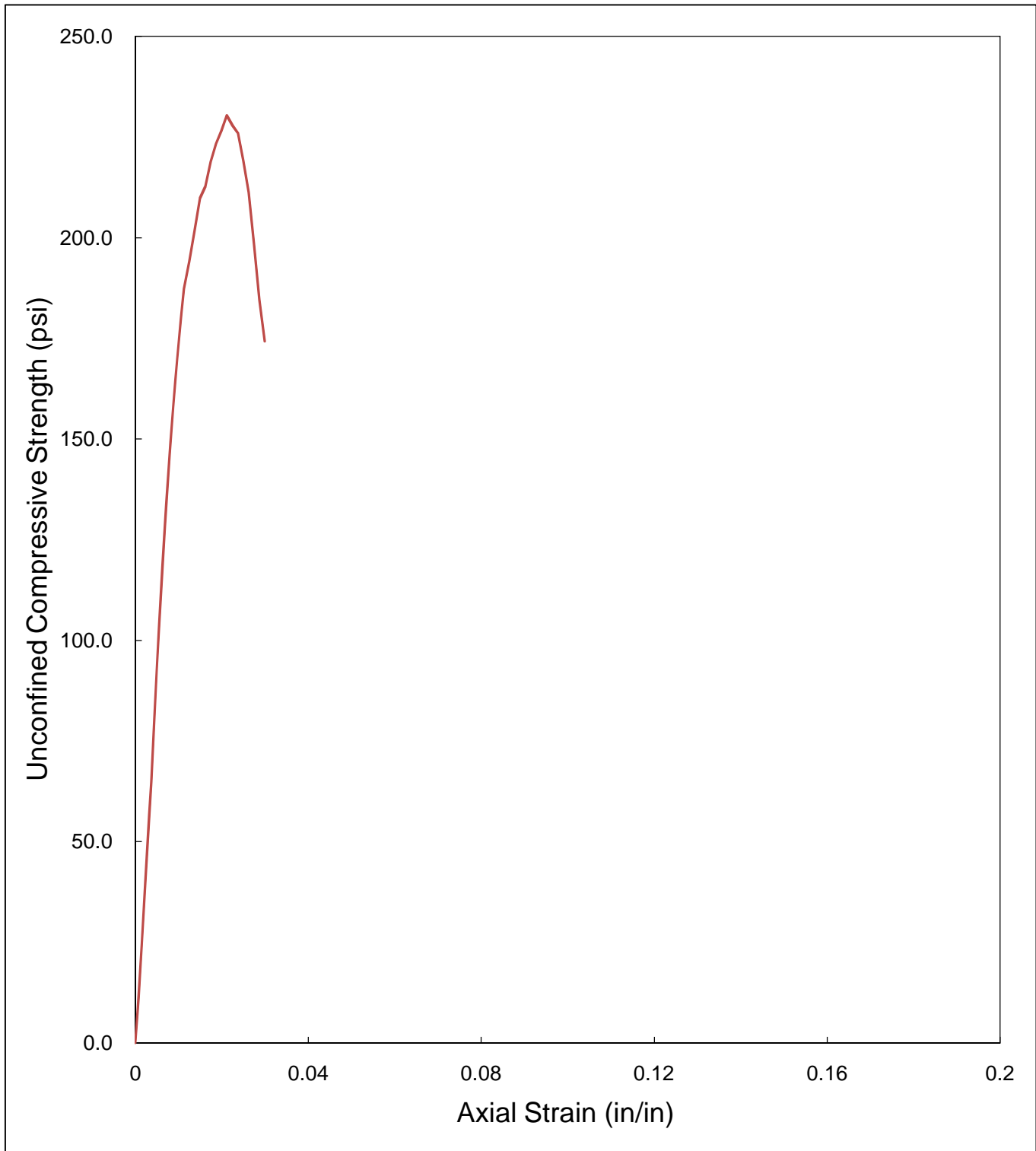
SOIL SPECIMEN DIMENSIONS		
	DIAMETER	LENGTH
No. 1	1.98 in.	3.99 in.
No. 2	1.98 in.	4.02 in.
No. 3	1.99 in.	4.02 in.
Average	1.98 in.	4.01 in.

SPECIMEN CONDITIONS	
Initial Specimen WT, Wo	464.21 g
Initial Area, Ao	3.09 in <sup>2</sup>
Initial Volume, Vo	12.39 in <sup>3</sup>
Initial Bulk Unit Weight,	142.7 lb/ft <sup>3</sup>
Initial Dry Unit Weight	128.0 lb/ft <sup>3</sup>
15 % Strain (0.15 Lo)	0.60 in.
UCS	230.3 lb/in <sup>2</sup>

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in <sup>2</sup> )	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in <sup>2</sup> )
0	0.000	0.000	3.089	0.0000	0.0
35	0.003	0.003	3.092	0.0007	11.3
61	0.005	0.005	3.093	0.0012	19.7
93	0.007	0.007	3.095	0.0017	30.0
132	0.010	0.010	3.097	0.0025	42.6
201	0.015	0.015	3.101	0.0037	64.8
288	0.020	0.020	3.105	0.0050	92.8
362	0.025	0.025	3.109	0.0062	116.4
428	0.030	0.030	3.113	0.0075	137.5
493	0.035	0.035	3.117	0.0087	158.2
543	0.040	0.040	3.121	0.0100	174.0
585	0.045	0.045	3.125	0.0112	187.2
607	0.050	0.050	3.128	0.0125	194.0
632	0.055	0.055	3.132	0.0137	201.8
658	0.060	0.060	3.136	0.0150	209.8
668	0.065	0.065	3.140	0.0162	212.7
688	0.070	0.070	3.144	0.0175	218.8
703	0.075	0.075	3.148	0.0187	223.3
714	0.080	0.080	3.152	0.0200	226.5
727	0.085	0.085	3.156	0.0212	230.3
720	0.090	0.090	3.160	0.0224	227.8
715	0.095	0.095	3.164	0.0237	225.9
694	0.100	0.100	3.168	0.0249	219.0
670	0.105	0.105	3.173	0.0262	211.2
630	0.110	0.110	3.177	0.0274	198.3
587	0.115	0.115	3.181	0.0287	184.6
555	0.120	0.120	3.185	0.0299	174.3

# UNCONFINED COMPRESSION TESTING

Sample No. 0301-011 (14-Day)



# UNCONFINED COMPRESSION TEST

ASTM D 2166

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-011 (14-Day)  
TESTING DATE: 5/15/2009  
TESTED BY: RSL

LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5832\_US

TESTING PARAMETER AND RESULTS	
MOISTURE CONTENT	11.5 %
BULK UNIT WEIGHT	142.7 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	128.0 lb/ft <sup>3</sup>
UCS *	230.3 lb/in <sup>2</sup>

\* UCS - UNCONFINED COMPRESSIVE STRENGTH

## ASTM D 2166

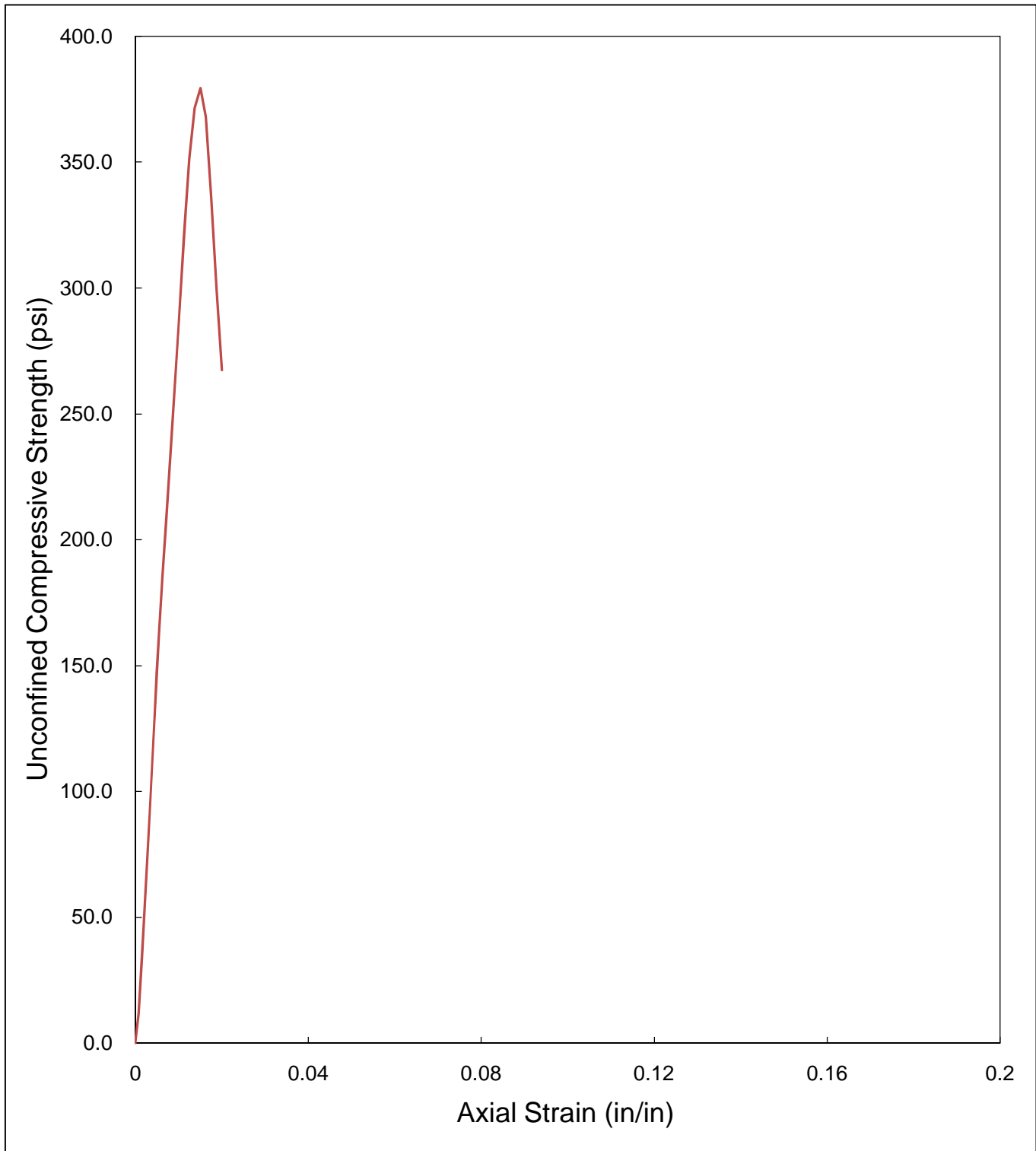
LOADING RATE:	0.04 in./min.
TRACKING CODE:	5881 US

<b>SOIL SPECIMEN DIMENSIONS</b>		
	<b>DIAMETER</b>	<b>LENGTH</b>
No. 1	1.98 in.	3.98 in.
No. 2	2.00 in.	4.00 in.
No. 3	2.01 in.	4.00 in.
<b>Average</b>	<b>2.00 in.</b>	<b>3.99 in.</b>

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# UNCONFINED COMPRESSION TESTING

Sample No. 0301-011 (28 day)



# UNCONFINED COMPRESSION TEST

ASTM D 2166

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-011 (28 day)  
TESTING DATE: 5/28/2009  
TESTED BY: SEM

LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5881 US

TESTING PARAMETER AND RESULTS	
MOISTURE CONTENT	10.3 %
BULK UNIT WEIGHT	143.6 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	130.2 lb/ft <sup>3</sup>
UCS *	379.4 lb/in <sup>2</sup>

\* UCS - UNCONFINED COMPRESSIVE STRENGTH

# UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT: Norwich MGP  
 PROJECT No.: SE-0301  
 SAMPLE No.: 0301-012 (7-Day)  
 TESTING DATE: 8-May-09  
 TESTED BY: RSL

LOADING RATE: 0.04 in./min.  
 TRACKING CODE: 5812\_US

MOISTURE CONTENT (Dry Basis)	
1. MOISTURE TIN NO.	0301-012
2. WT MOISTURE TIN (tare weight)	69.79 g
3. WT WET SOIL + TARE	139.50 g
4. WT DRY SOIL + TARE	130.94 g
5. WT WATER, W <sub>w</sub>	8.56 g
6. WT DRY SOIL, W <sub>s</sub>	61.15 g
7. MOISTURE CONTENT, W	14.00 %

SOIL SPECIMEN DIMENSIONS		
	DIAMETER	LENGTH
No. 1	2.01 in.	3.98 in.
No. 2	2.00 in.	3.98 in.
No. 3	2.01 in.	3.97 in.
Average	2.01 in.	3.98 in.

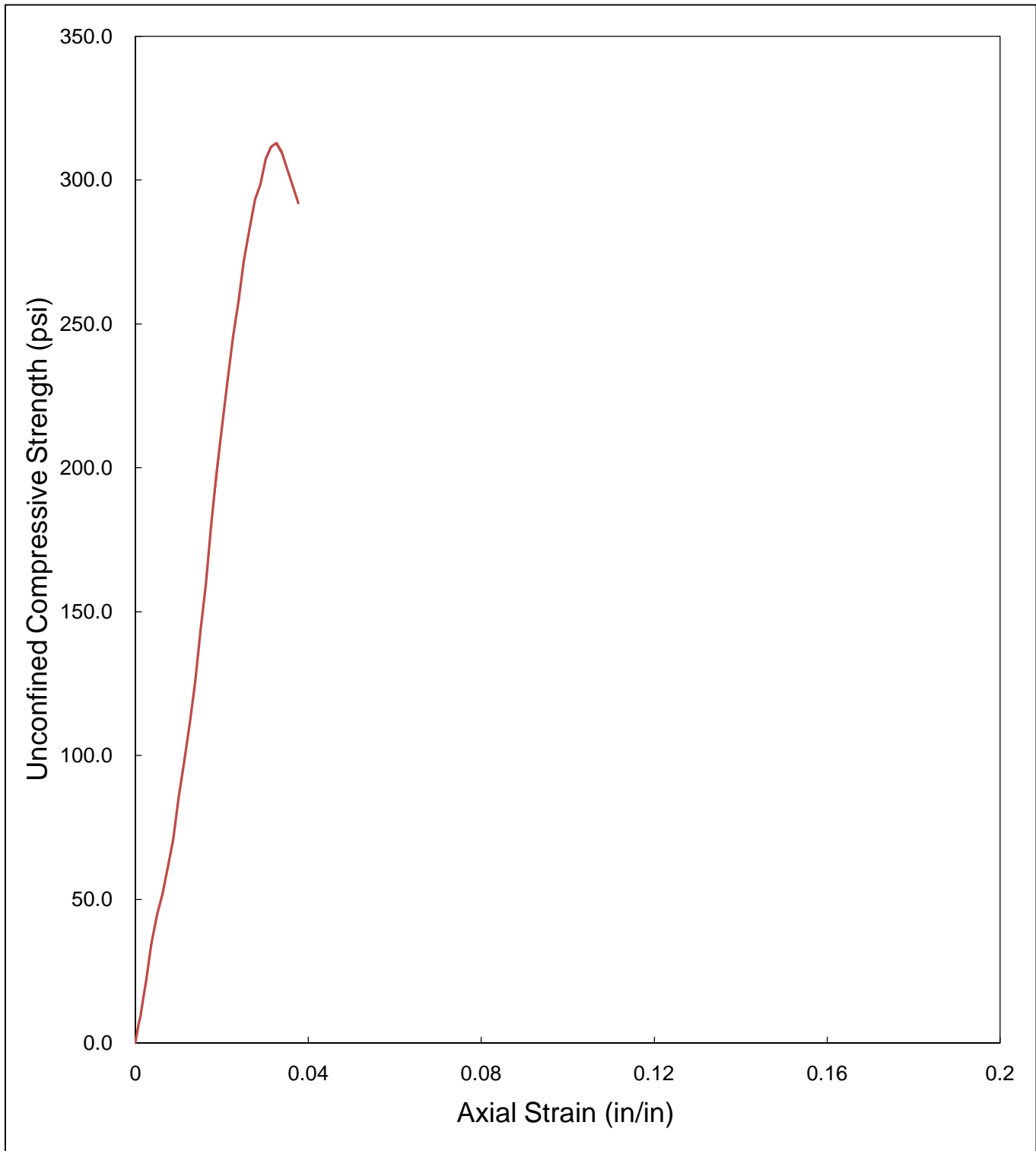
SPECIMEN CONDITIONS	
Initial Specimen WT, W <sub>o</sub>	436.82 g
Initial Area, A <sub>o</sub>	3.16 in <sup>2</sup>
Initial Volume, V <sub>o</sub>	12.58 in <sup>3</sup>
Initial Bulk Unit Weight,	132.3 lb/ft <sup>3</sup>
Initial Dry Unit Weight	116.1 lb/ft <sup>3</sup>
15 % Strain (0.15 L <sub>o</sub> )	0.60 in.
UCS	312.9 lb/in <sup>2</sup>

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in <sup>2</sup> )	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in <sup>2</sup> )
0	0.000	0.000	3.163	0.0000	0.0
21	0.003	0.003	3.165	0.0008	6.6
30	0.005	0.005	3.167	0.0013	9.5
48	0.007	0.007	3.168	0.0018	15.2
67	0.010	0.010	3.171	0.0025	21.1
109	0.015	0.015	3.175	0.0038	34.3
142	0.020	0.020	3.179	0.0050	44.7
165	0.025	0.025	3.183	0.0063	51.8
195	0.030	0.030	3.187	0.0075	61.2
226	0.035	0.035	3.191	0.0088	70.8
272	0.040	0.040	3.195	0.0101	85.1
311	0.045	0.045	3.199	0.0113	97.2
356	0.050	0.050	3.203	0.0126	111.2
402	0.055	0.055	3.207	0.0138	125.4
460	0.060	0.060	3.211	0.0151	143.3
512	0.065	0.065	3.215	0.0163	159.2
580	0.070	0.070	3.219	0.0176	180.2
639	0.075	0.075	3.223	0.0189	198.2
695	0.080	0.080	3.228	0.0201	215.3
746	0.085	0.085	3.232	0.0214	230.8
795	0.090	0.090	3.236	0.0226	245.7
835	0.095	0.095	3.240	0.0239	257.7
882	0.100	0.100	3.244	0.0251	271.9
920	0.105	0.105	3.248	0.0264	283.2
954	0.110	0.110	3.253	0.0277	293.3
972	0.115	0.115	3.257	0.0289	298.5
1002	0.120	0.120	3.261	0.0302	307.3
1017	0.125	0.125	3.265	0.0314	311.5
1023	0.130	0.130	3.269	0.0327	312.9
1014	0.135	0.135	3.274	0.0339	309.7
960	0.150	0.150	3.287	0.0377	292.1



# UNCONFINED COMPRESSION TESTING

Sample No. 0301-012 (7-Day)



# UNCONFINED COMPRESSION TEST

ASTM D 2166

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-012 (7-Day)  
TESTING DATE: 5/8/2009  
TESTED BY: RSL

LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5812\_US

TESTING PARAMETER AND RESULTS	
MOISTURE CONTENT	14.0 %
BULK UNIT WEIGHT	132.3 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	116.1 lb/ft <sup>3</sup>
UCS *	312.9 lb/in <sup>2</sup>

\* UCS - UNCONFINED COMPRESSIVE STRENGTH

# UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT: Norwich MGP  
 PROJECT No.: SE-0301  
 SAMPLE No.: 0301-012 (14-Day)  
 TESTING DATE: 15-May-09  
 TESTED BY: RSL

LOADING RATE: 0.04 in./min.  
 TRACKING CODE: 5833\_US

MOISTURE CONTENT (Dry Basis)	
1. MOISTURE TIN NO.	0301-012
2. WT MOISTURE TIN (tare weight)	87.19 g
3. WT WET SOIL + TARE	139.53 g
4. WT DRY SOIL + TARE	133.39 g
5. WT WATER, Ww	6.14 g
6. WT DRY SOIL, Ws	46.20 g
7. MOISTURE CONTENT, W	13.29 %

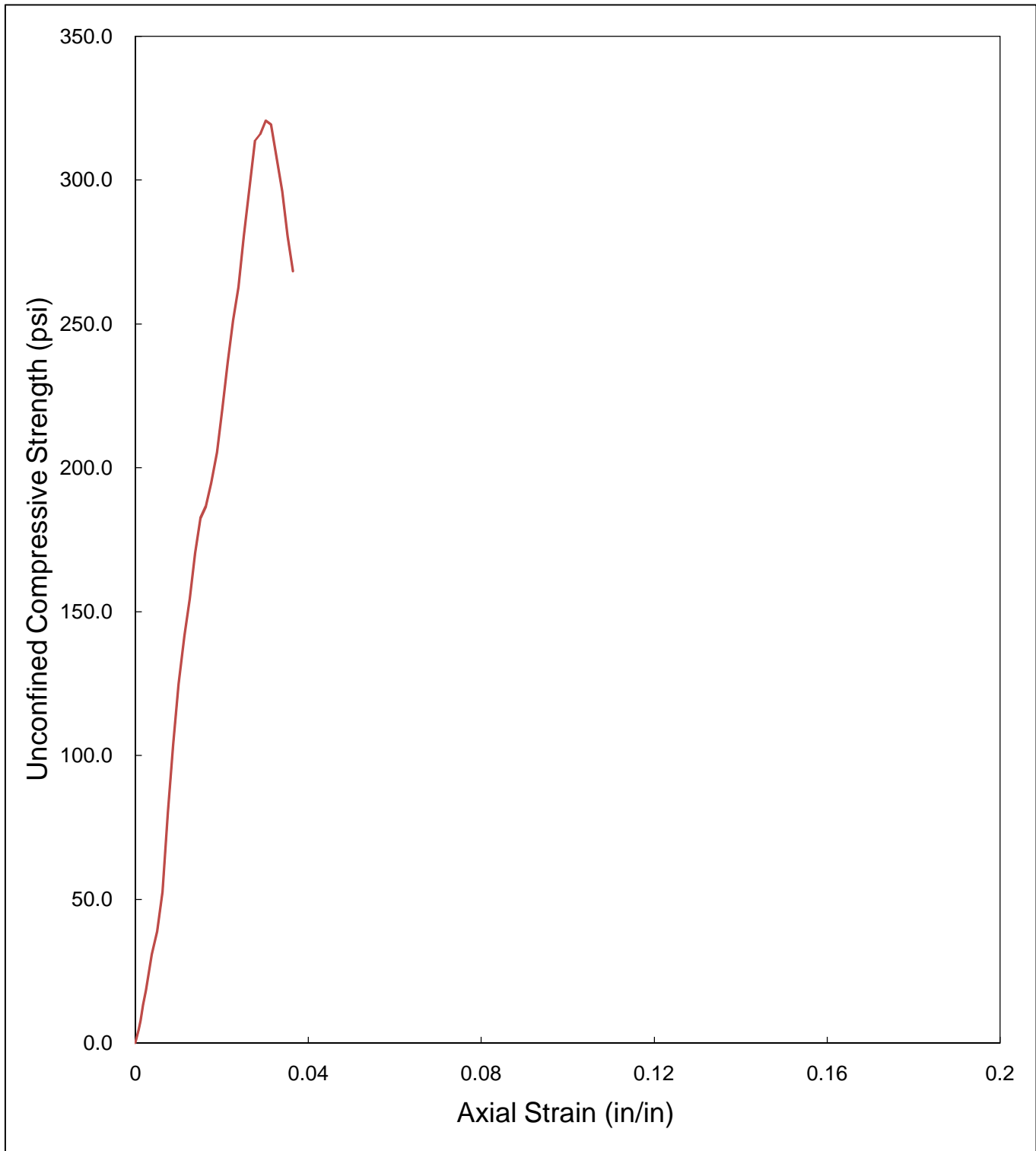
SOIL SPECIMEN DIMENSIONS		
	DIAMETER	LENGTH
No. 1	2.00 in.	4.00 in.
No. 2	1.98 in.	3.97 in.
No. 3	1.99 in.	3.98 in.
Average	1.99 in.	3.98 in.

SPECIMEN CONDITIONS	
Initial Specimen WT, Wo	438.63 g
Initial Area, Ao	3.11 in <sup>2</sup>
Initial Volume, Vo	12.39 in <sup>3</sup>
Initial Bulk Unit Weight,	134.9 lb/ft <sup>3</sup>
Initial Dry Unit Weight	119.1 lb/ft <sup>3</sup>
15 % Strain (0.15 Lo)	0.60 in.
UCS	320.6 lb/in <sup>2</sup>

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in <sup>2</sup> )	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in <sup>2</sup> )
0	0.000	0.000	3.110	0.0000	0.0
14	0.003	0.003	3.113	0.0008	4.5
24	0.005	0.005	3.114	0.0013	7.7
41	0.007	0.007	3.116	0.0018	13.2
57	0.010	0.010	3.118	0.0025	18.3
96	0.015	0.015	3.122	0.0038	30.7
121	0.020	0.020	3.126	0.0050	38.7
164	0.025	0.025	3.130	0.0063	52.4
251	0.030	0.030	3.134	0.0075	80.1
326	0.035	0.035	3.138	0.0088	103.9
392	0.040	0.040	3.142	0.0100	124.8
445	0.045	0.045	3.146	0.0113	141.5
486	0.050	0.050	3.150	0.0126	154.3
537	0.055	0.055	3.154	0.0138	170.3
576	0.060	0.060	3.158	0.0151	182.4
590	0.065	0.065	3.162	0.0163	186.6
616	0.070	0.070	3.166	0.0176	194.6
651	0.075	0.075	3.170	0.0188	205.4
700	0.080	0.080	3.174	0.0201	220.5
752	0.085	0.085	3.178	0.0213	236.6
799	0.090	0.090	3.182	0.0226	251.1
837	0.095	0.095	3.186	0.0238	262.7
895	0.100	0.100	3.190	0.0251	280.5
951	0.105	0.105	3.194	0.0264	297.7
1003	0.110	0.110	3.199	0.0276	313.6
1012	0.115	0.115	3.203	0.0289	316.0
1028	0.120	0.120	3.207	0.0301	320.6
1025	0.125	0.125	3.211	0.0314	319.2
953	0.135	0.135	3.219	0.0339	296.0
904	0.140	0.140	3.224	0.0351	280.4
866	0.145	0.145	3.228	0.0364	268.3

# UNCONFINED COMPRESSION TESTING

Sample No. 0301-012 (14-Day)



# UNCONFINED COMPRESSION TEST

ASTM D 2166

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-012 (14-Day)  
TESTING DATE: 5/15/2009  
TESTED BY: RSL

LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5833\_US

TESTING PARAMETER AND RESULTS	
MOISTURE CONTENT	13.3 %
BULK UNIT WEIGHT	134.9 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	119.1 lb/ft <sup>3</sup>
UCS *	320.6 lb/in <sup>2</sup>

\* UCS - UNCONFINED COMPRESSIVE STRENGTH

# UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT: Norwich MGP  
 PROJECT No.: SE-0301  
 SAMPLE No.: 0301-012 (28 day)  
 TESTING DATE: 28-May-09  
 TESTED BY: SEM/MP

LOADING RATE: 0.04 in./min.  
 TRACKING CODE: 5882 US

MOISTURE CONTENT (Dry Basis)	
1. MOISTURE TIN NO.	0301-012
2. WT MOISTURE TIN (tare weight)	69.87 g
3. WT WET SOIL + TARE	160.35 g
4. WT DRY SOIL + TARE	150.87 g
5. WT WATER, Ww	9.48 g
6. WT DRY SOIL, Ws	81.00 g
7. MOISTURE CONTENT, W	11.70 %

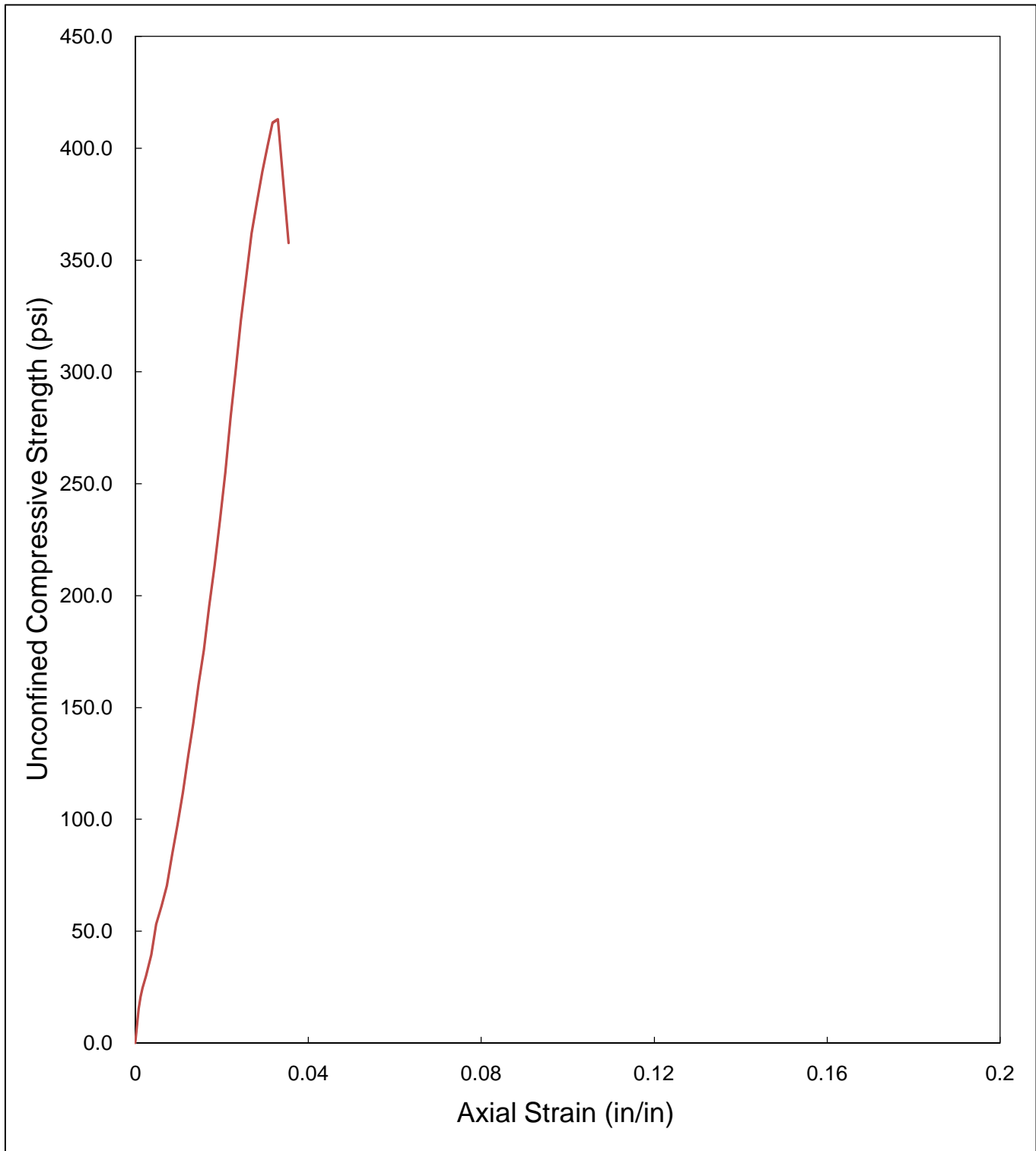
SOIL SPECIMEN DIMENSIONS		
	DIAMETER	LENGTH
No. 1	2.01 in.	4.06 in.
No. 2	2.02 in.	4.08 in.
No. 3	2.03 in.	4.12 in.
Average	2.02 in.	4.09 in.

SPECIMEN CONDITIONS	
Initial Specimen WT, Wo	452.86 g
Initial Area, Ao	3.20 in <sup>2</sup>
Initial Volume, Vo	13.10 in <sup>3</sup>
Initial Bulk Unit Weight,	131.7 lb/ft <sup>3</sup>
Initial Dry Unit Weight	117.9 lb/ft <sup>3</sup>
15 % Strain (0.15 Lo)	0.61 in.
UCS	412.8 lb/in <sup>2</sup>

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in <sup>2</sup> )	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in <sup>2</sup> )
0	0.000	0.000	3.205	0.0000	0.0
49	0.003	0.003	3.207	0.0007	15.3
66	0.005	0.005	3.209	0.0012	20.6
79	0.007	0.007	3.210	0.0017	24.6
96	0.010	0.010	3.213	0.0024	29.9
127	0.015	0.015	3.217	0.0037	39.5
171	0.020	0.020	3.220	0.0049	53.1
197	0.025	0.025	3.224	0.0061	61.1
227	0.030	0.030	3.228	0.0073	70.3
273	0.035	0.035	3.232	0.0086	84.5
316	0.040	0.040	3.236	0.0098	97.6
363	0.045	0.045	3.240	0.0110	112.0
417	0.050	0.050	3.244	0.0122	128.5
463	0.055	0.055	3.248	0.0135	142.5
521	0.060	0.060	3.252	0.0147	160.2
572	0.065	0.065	3.257	0.0159	175.6
637	0.070	0.070	3.261	0.0171	195.4
696	0.075	0.075	3.265	0.0184	213.2
763	0.080	0.080	3.269	0.0196	233.4
834	0.085	0.085	3.273	0.0208	254.8
917	0.090	0.090	3.277	0.0220	279.8
984	0.095	0.095	3.281	0.0232	299.9
1061	0.100	0.100	3.285	0.0245	323.0
1126	0.105	0.105	3.289	0.0257	342.3
1192	0.110	0.110	3.293	0.0269	361.9
1239	0.115	0.115	3.298	0.0281	375.7
1285	0.120	0.120	3.302	0.0294	389.2
1326	0.125	0.125	3.306	0.0306	401.1
1361	0.130	0.130	3.310	0.0318	411.2
1368	0.135	0.135	3.314	0.0330	412.8
1188	0.145	0.145	3.323	0.0355	357.5

# UNCONFINED COMPRESSION TESTING

Sample No. 0301-012 (28 day)



# UNCONFINED COMPRESSION TEST

ASTM D 2166

## SUMMARY OF RESULTS

PROJECT:	Norwich MGP		
PROJECT No.:	SE-0301		
SAMPLE No.:	0301-012 (28 day)		
TESTING DATE:	5/28/2009	LOADING RATE:	0.04 in./min.
TESTED BY:	SEM/MP	TRACKING CODE:	5882 US

TESTING PARAMETER AND RESULTS	
MOISTURE CONTENT	11.7 %
BULK UNIT WEIGHT	131.7 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	117.9 lb/ft <sup>3</sup>
UCS *	412.8 lb/in <sup>2</sup>

\* UCS - UNCONFINED COMPRESSIVE STRENGTH



## ASTM D 2166

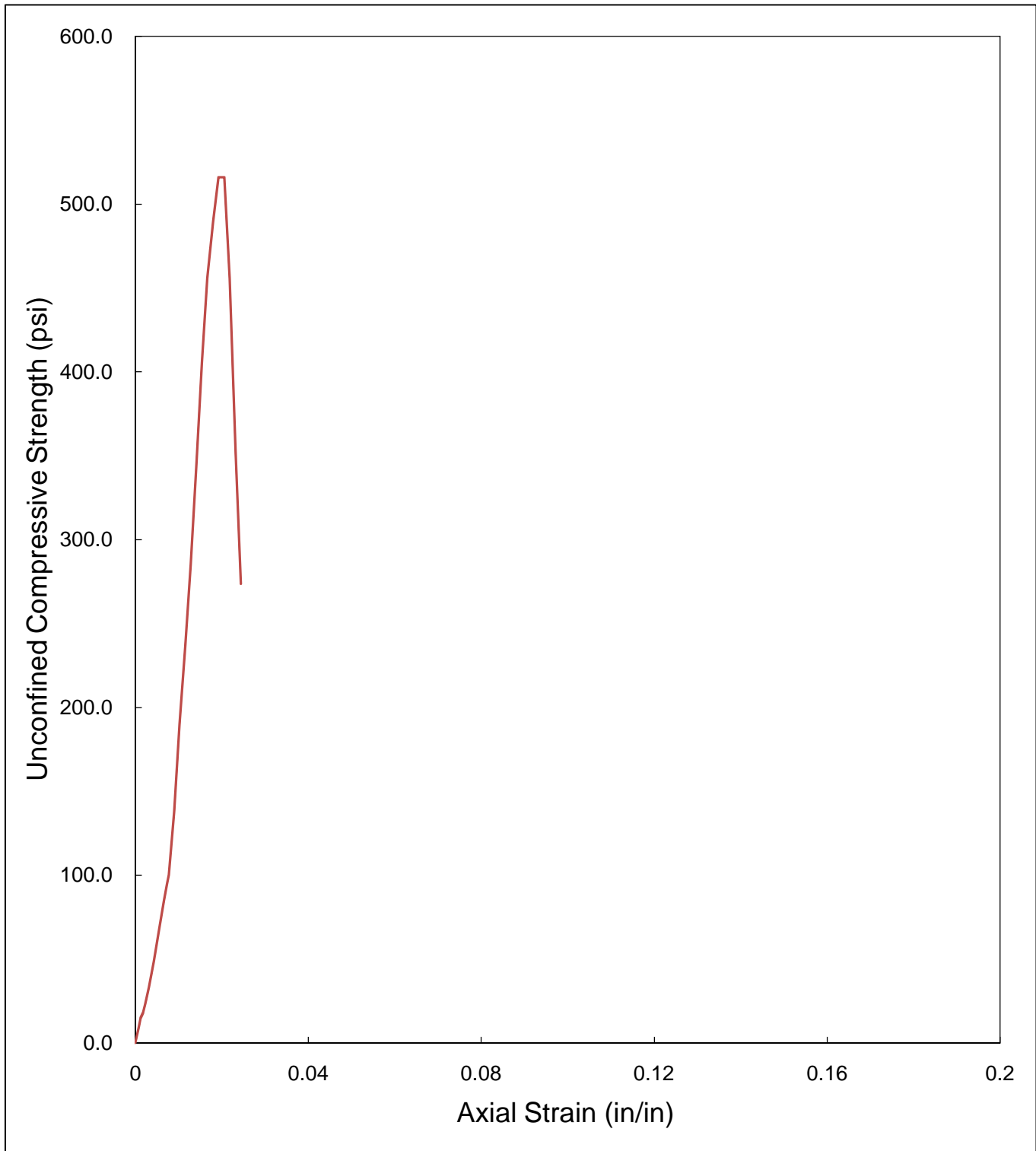
LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5813\_US

SOIL SPECIMEN DIMENSIONS		
	DIAMETER	LENGTH
No. 1	2.00 in.	3.89 in.
No. 2	2.00 in.	3.90 in.
No. 3	1.98 in.	3.90 in.
<b>Average</b>	<b>1.99 in.</b>	<b>3.90 in.</b>

[illegible]

# UNCONFINED COMPRESSION TESTING

Sample No. 0301-013 (7-Day)



# UNCONFINED COMPRESSION TEST

ASTM D 2166

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-013 (7-Day)  
TESTING DATE: 5/11/2009  
TESTED BY: RSL

LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5813\_US

TESTING PARAMETER AND RESULTS	
MOISTURE CONTENT	17.1 %
BULK UNIT WEIGHT	127.0 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	108.4 lb/ft <sup>3</sup>
UCS *	516.0 lb/in <sup>2</sup>

\* UCS - UNCONFINED COMPRESSIVE STRENGTH

## ASTM D 2166

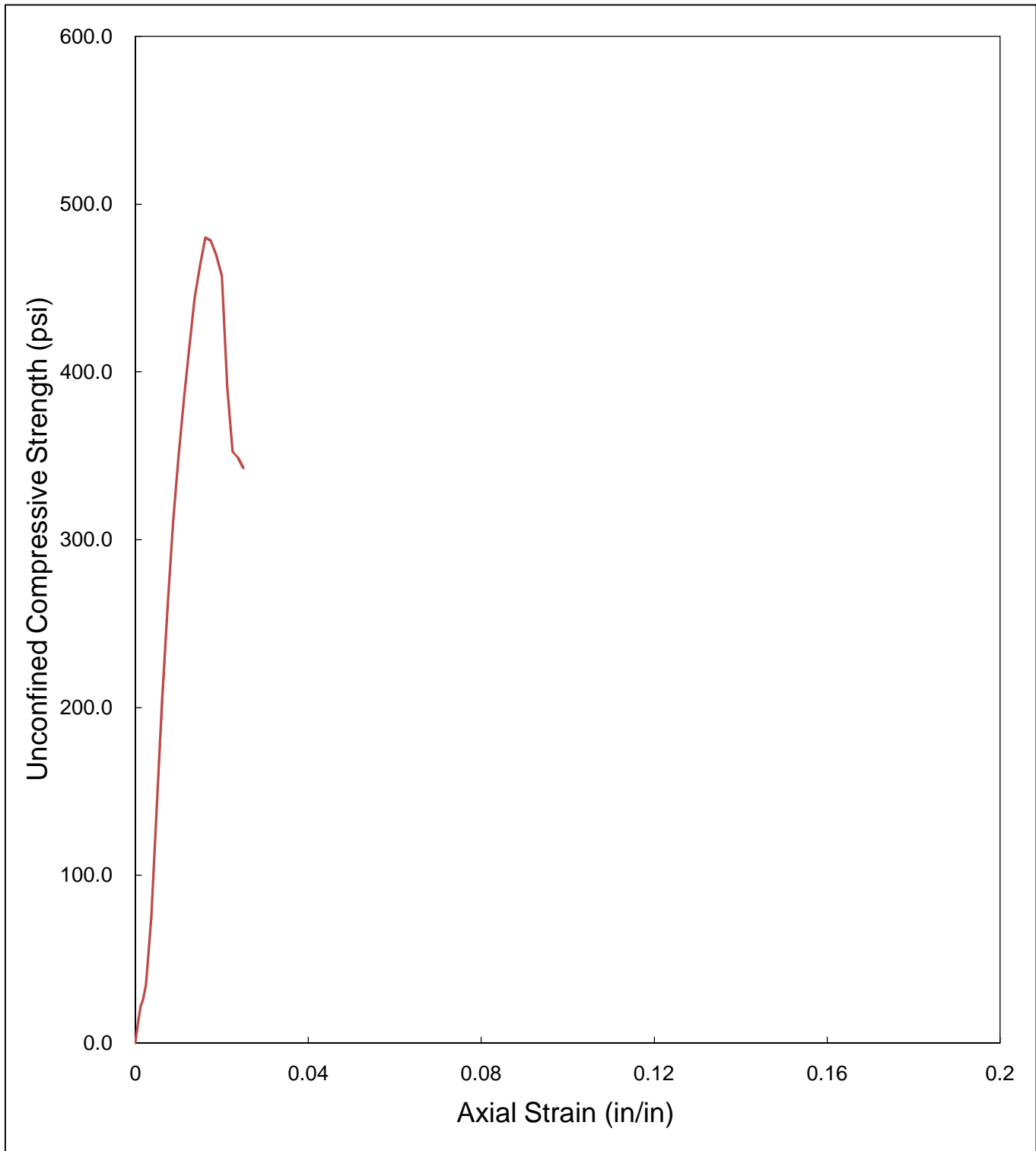
LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5838 US

SOIL SPECIMEN DIMENSIONS		
	DIAMETER	LENGTH
No. 1	1.98 in.	4.00 in.
No. 2	2.01 in.	4.00 in.
No. 3	2.02 in.	4.00 in.
<b>Average</b>	<b>2.00 in.</b>	<b>4.00 in.</b>

[illegible]

# UNCONFINED COMPRESSION TESTING

Sample No. 0301-013 (14-Day)



# UNCONFINED COMPRESSION TEST

ASTM D 2166

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-013 (14-Day)  
TESTING DATE: 5/18/2009  
TESTED BY: SEM

LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5838\_US

TESTING PARAMETER AND RESULTS	
MOISTURE CONTENT	22.9 %
BULK UNIT WEIGHT	122.4 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	99.6 lb/ft <sup>3</sup>
UCS *	480.0 lb/in <sup>2</sup>

\* UCS - UNCONFINED COMPRESSIVE STRENGTH

## ASTM D 2166

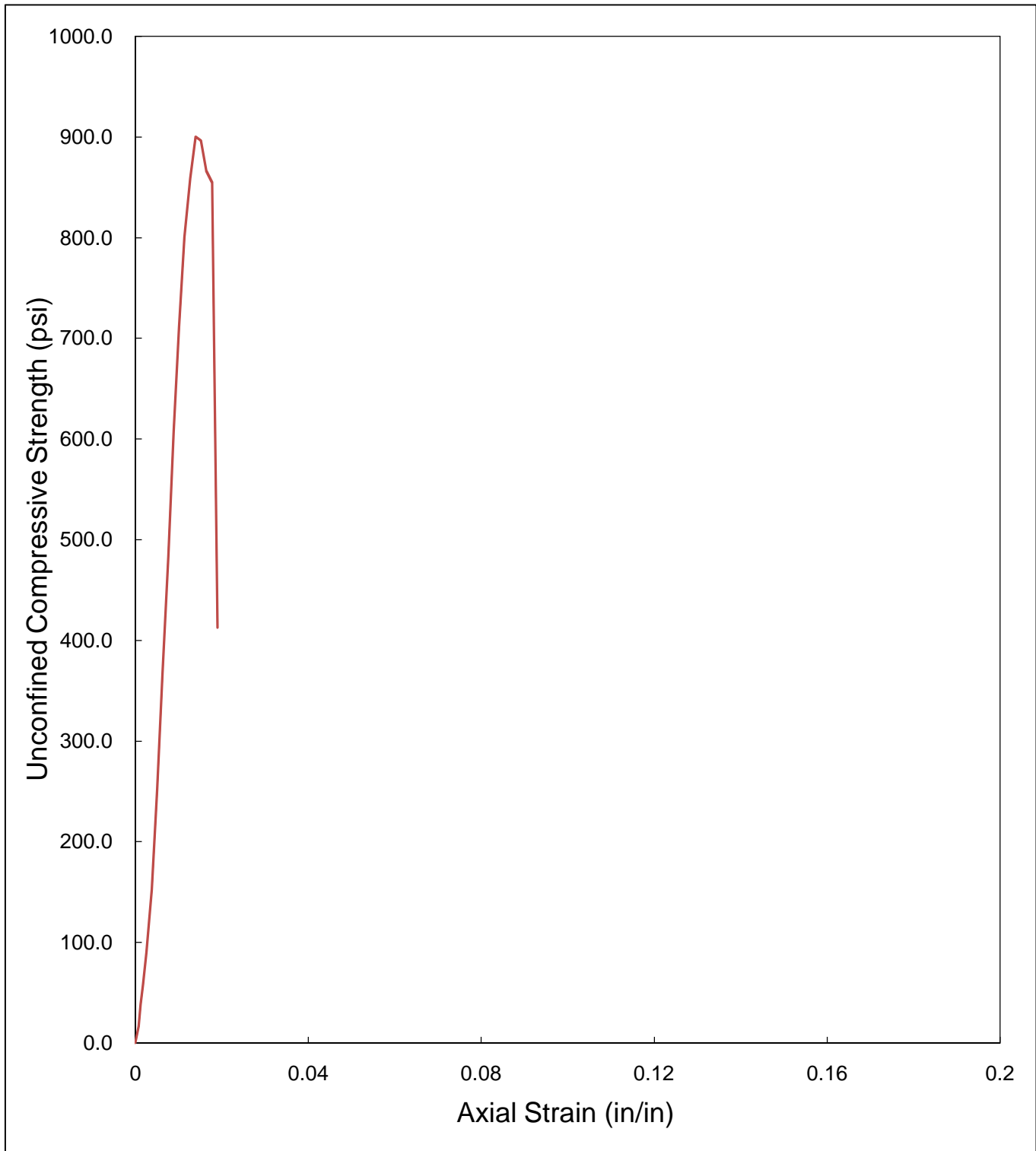
LOADING RATE:	0.04 in./min.
TRACKING CODE:	5884 US

SOIL SPECIMEN DIMENSIONS		
	DIAMETER	LENGTH
No. 1	1.99 in.	3.95 in.
No. 2	1.99 in.	3.96 in.
No. 3	2.00 in.	3.96 in.
<b>Average</b>	<b>1.99 in.</b>	<b>3.96 in.</b>

[illegible]

# UNCONFINED COMPRESSION TESTING

Sample No. 0301-013 (28-Day)





# UNCONFINED COMPRESSION TEST

ASTM D 2166

## SUMMARY OF RESULTS

PROJECT:	Delaware DOT		
PROJECT No.:	SE-0293		
SAMPLE No.:	0301-013 (28-Day)		
TESTING DATE:	6/1/2009	LOADING RATE:	0.04 in./min.
TESTED BY:	SEM/MP	TRACKING CODE:	5884 US

TESTING PARAMETER AND RESULTS	
MOISTURE CONTENT	15.5 %
BULK UNIT WEIGHT	128.0 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	110.8 lb/ft <sup>3</sup>
UCS *	899.9 lb/in <sup>2</sup>

\* UCS - UNCONFINED COMPRESSIVE STRENGTH

## ASTM D 2166

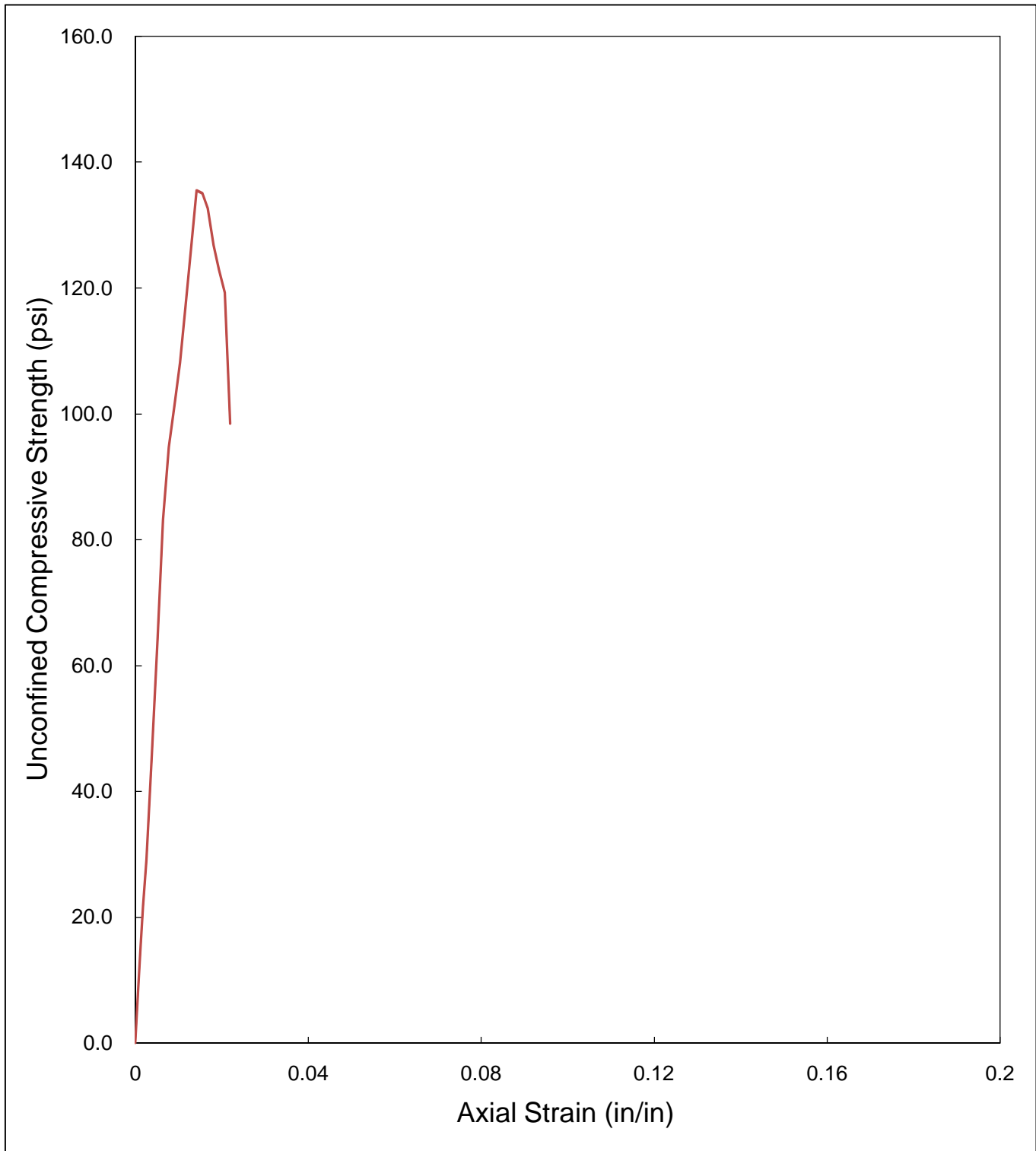
LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5817\_US

<b>SOIL SPECIMEN DIMENSIONS</b>		
	<b>DIAMETER</b>	<b>LENGTH</b>
No. 1	1.98 in.	3.88 in.
No. 2	2.00 in.	3.89 in.
No. 3	2.00 in.	3.89 in.
<b>Average</b>	<b>1.99 in.</b>	<b>3.89 in.</b>

[illegible]

# UNCONFINED COMPRESSION TESTING

Sample No. 0301-014 (7-Day)



# UNCONFINED COMPRESSION TEST

ASTM D 2166

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-014 (7-Day)  
TESTING DATE: 5/12/2009  
TESTED BY: SEM

LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5817\_US

TESTING PARAMETER AND RESULTS	
MOISTURE CONTENT	18.4 %
BULK UNIT WEIGHT	126.8 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	107.1 lb/ft <sup>3</sup>
UCS *	135.5 lb/in <sup>2</sup>

\* UCS - UNCONFINED COMPRESSIVE STRENGTH

## ASTM D 2166

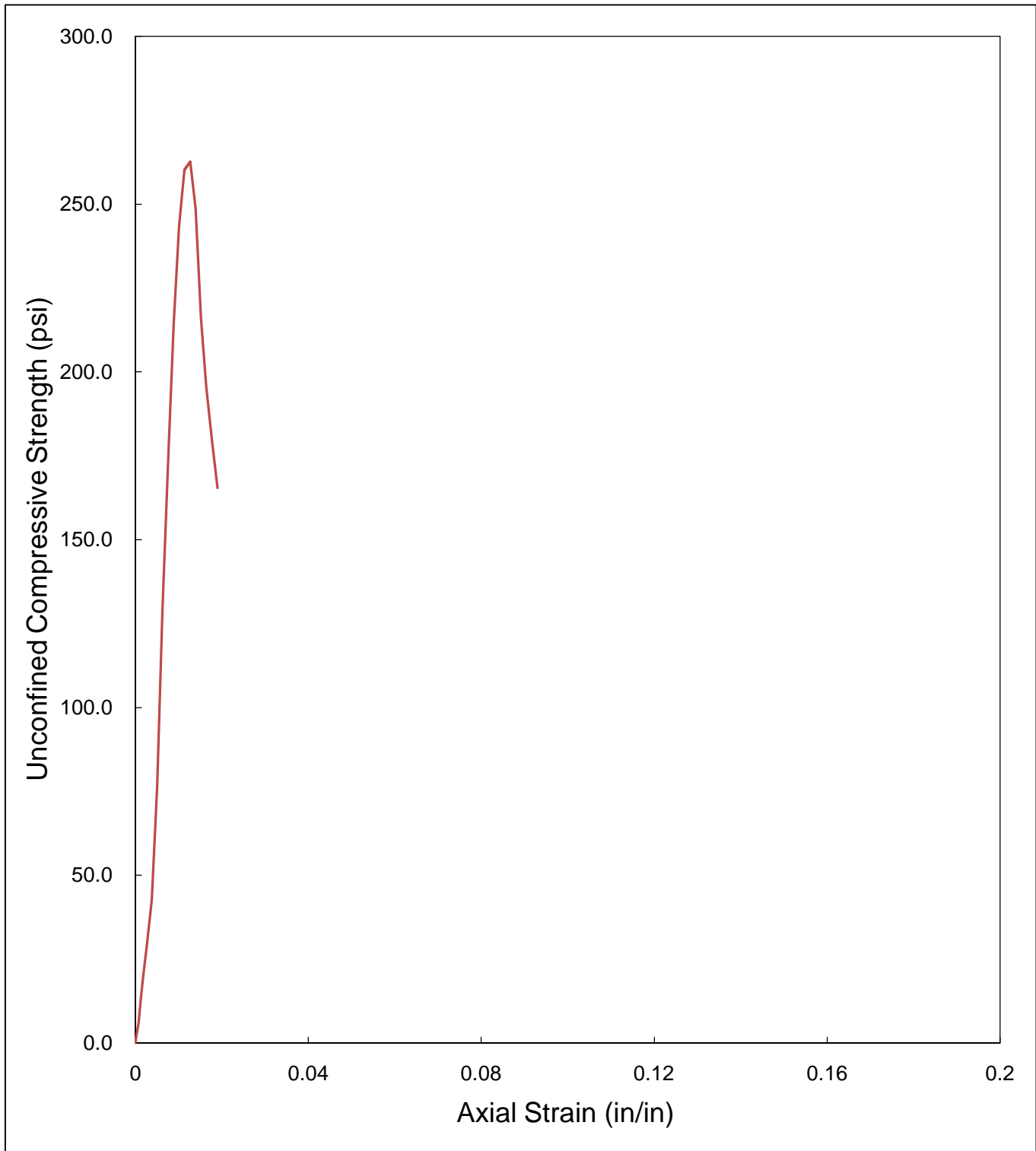
LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5842\_US

SOIL SPECIMEN DIMENSIONS		
	DIAMETER	LENGTH
No. 1	1.99 in.	3.94 in.
No. 2	2.00 in.	3.94 in.
No. 3	2.00 in.	3.95 in.
Average	2.00 in.	3.94 in.

[illegible]

# UNCONFINED COMPRESSION TESTING

Sample No. 0301-014 (14-Day)



# UNCONFINED COMPRESSION TEST

ASTM D 2166

## SUMMARY OF RESULTS

PROJECT:	Norwich MGP		
PROJECT No.:	SE-0301		
SAMPLE No.:	0301-014 (14-Day)		
TESTING DATE:	5/19/2009	LOADING RATE:	0.04 in./min.
TESTED BY:	SEM	TRACKING CODE:	5842_US

TESTING PARAMETER AND RESULTS	
MOISTURE CONTENT	17.5 %
BULK UNIT WEIGHT	127.4 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	108.4 lb/ft <sup>3</sup>
UCS *	262.7 lb/in <sup>2</sup>

\* UCS - UNCONFINED COMPRESSIVE STRENGTH

# UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT: Norwich MGP  
 PROJECT No.: SE-0301  
 SAMPLE No.: 0301-014 (28 day)  
 TESTING DATE: 2-Jun-09  
 TESTED BY: MP

LOADING RATE: 0.04 in./min.  
 TRACKING CODE: 5891 US

MOISTURE CONTENT (Dry Basis)	
1. MOISTURE TIN NO.	0301-014
2. WT MOISTURE TIN (tare weight)	70.22 g
3. WT WET SOIL + TARE	163.51 g
4. WT DRY SOIL + TARE	149.00 g
5. WT WATER, Ww	14.51 g
6. WT DRY SOIL, Ws	78.78 g
7. MOISTURE CONTENT, W	18.42 %

SOIL SPECIMEN DIMENSIONS		
	DIAMETER	LENGTH
No. 1	1.98 in.	3.99 in.
No. 2	1.98 in.	4.00 in.
No. 3	1.99 in.	4.00 in.
Average	1.98 in.	4.00 in.

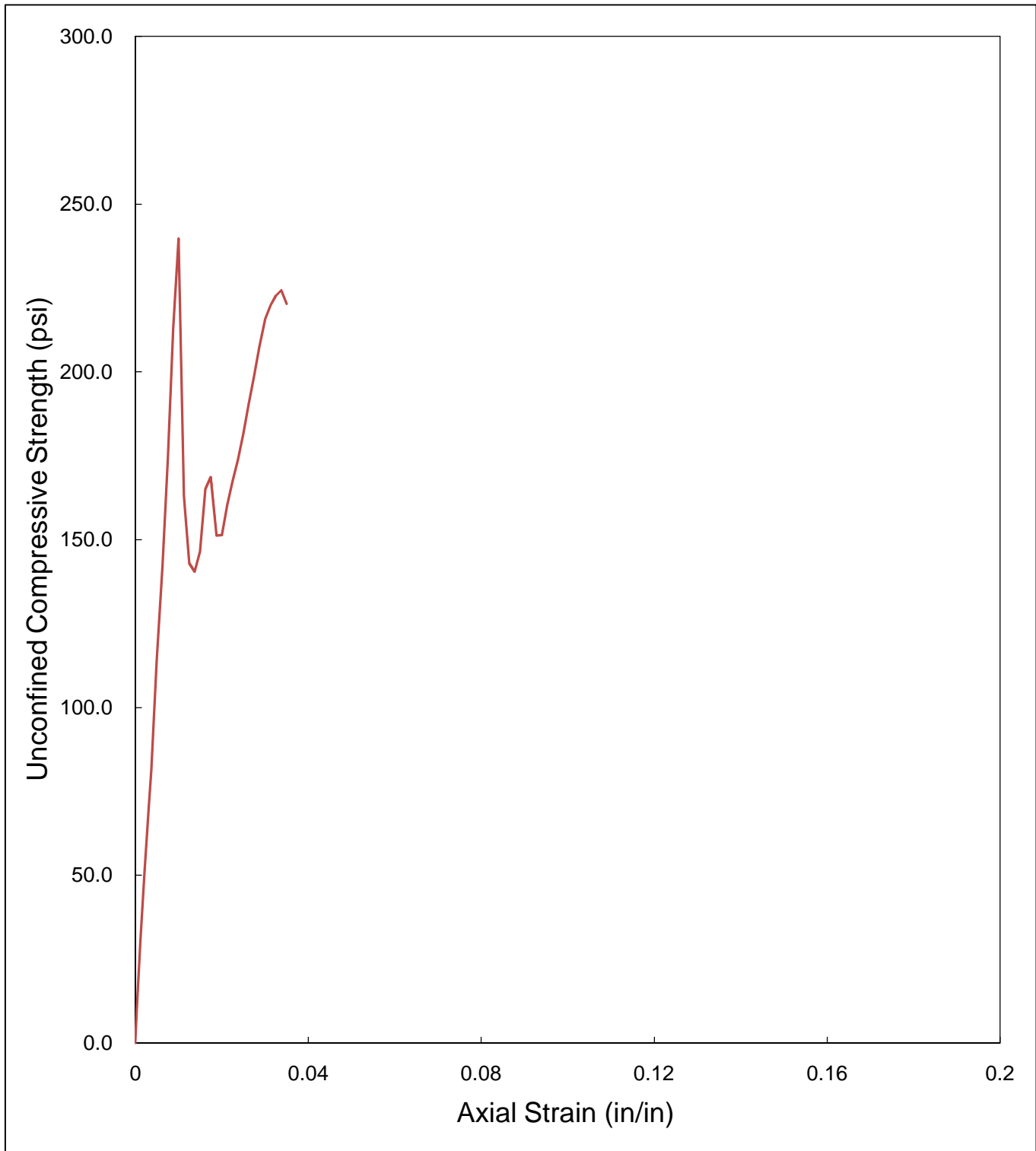
SPECIMEN CONDITIONS	
Initial Specimen WT, Wo	398.57 g
Initial Area, Ao	3.09 in <sup>2</sup>
Initial Volume, Vo	12.35 in <sup>3</sup>
Initial Bulk Unit Weight,	123.0 lb/ft <sup>3</sup>
Initial Dry Unit Weight	103.8 lb/ft <sup>3</sup>
15 % Strain (0.15 Lo)	0.60 in.
UCS	239.7 lb/in <sup>2</sup>

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in <sup>2</sup> )	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in <sup>2</sup> )
0	0.000	0.000	3.089	0.0000	0.0
66	0.003	0.003	3.092	0.0008	21.3
95	0.005	0.005	3.093	0.0013	30.7
135	0.007	0.007	3.095	0.0018	43.6
179	0.010	0.010	3.097	0.0025	57.8
252	0.015	0.015	3.101	0.0038	81.3
353	0.020	0.020	3.105	0.0050	113.7
442	0.025	0.025	3.109	0.0063	142.2
542	0.030	0.030	3.113	0.0075	174.1
664	0.035	0.035	3.117	0.0088	213.0
748	0.040	0.040	3.121	0.0100	239.7
509	0.045	0.045	3.125	0.0113	162.9
447	0.050	0.050	3.129	0.0125	142.9
440	0.055	0.055	3.133	0.0138	140.5
459	0.060	0.060	3.137	0.0150	146.3
518	0.065	0.065	3.141	0.0163	164.9
530	0.070	0.070	3.145	0.0175	168.5
476	0.075	0.075	3.149	0.0188	151.2
477	0.080	0.080	3.153	0.0200	151.3
506	0.085	0.085	3.157	0.0213	160.3
529	0.090	0.090	3.161	0.0225	167.4
550	0.095	0.095	3.165	0.0238	173.8
575	0.100	0.100	3.169	0.0250	181.5
604	0.105	0.105	3.173	0.0263	190.4
631	0.110	0.110	3.177	0.0275	198.6
660	0.115	0.115	3.181	0.0288	207.5
687	0.120	0.120	3.185	0.0300	215.7
701	0.125	0.125	3.189	0.0313	219.8
711	0.130	0.130	3.193	0.0325	222.7
717	0.135	0.135	3.197	0.0338	224.2
705	0.140	0.140	3.202	0.0350	220.2
645	0.145	0.145	3.206	0.0363	201.2
572	0.150	0.150	3.210	0.0375	178.2
519	0.155	0.155	3.214	0.0388	161.5



# UNCONFINED COMPRESSION TESTING

Sample No. 0301-014 (28 day)



# UNCONFINED COMPRESSION TEST

ASTM D 2166

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-014 (28 day)  
TESTING DATE: 6/2/2009  
TESTED BY: MP

LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5891 US

TESTING PARAMETER AND RESULTS	
MOISTURE CONTENT	18.4 %
BULK UNIT WEIGHT	123.0 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	103.8 lb/ft <sup>3</sup>
UCS *	239.7 lb/in <sup>2</sup>

\* UCS - UNCONFINED COMPRESSIVE STRENGTH

## ASTM D 2166

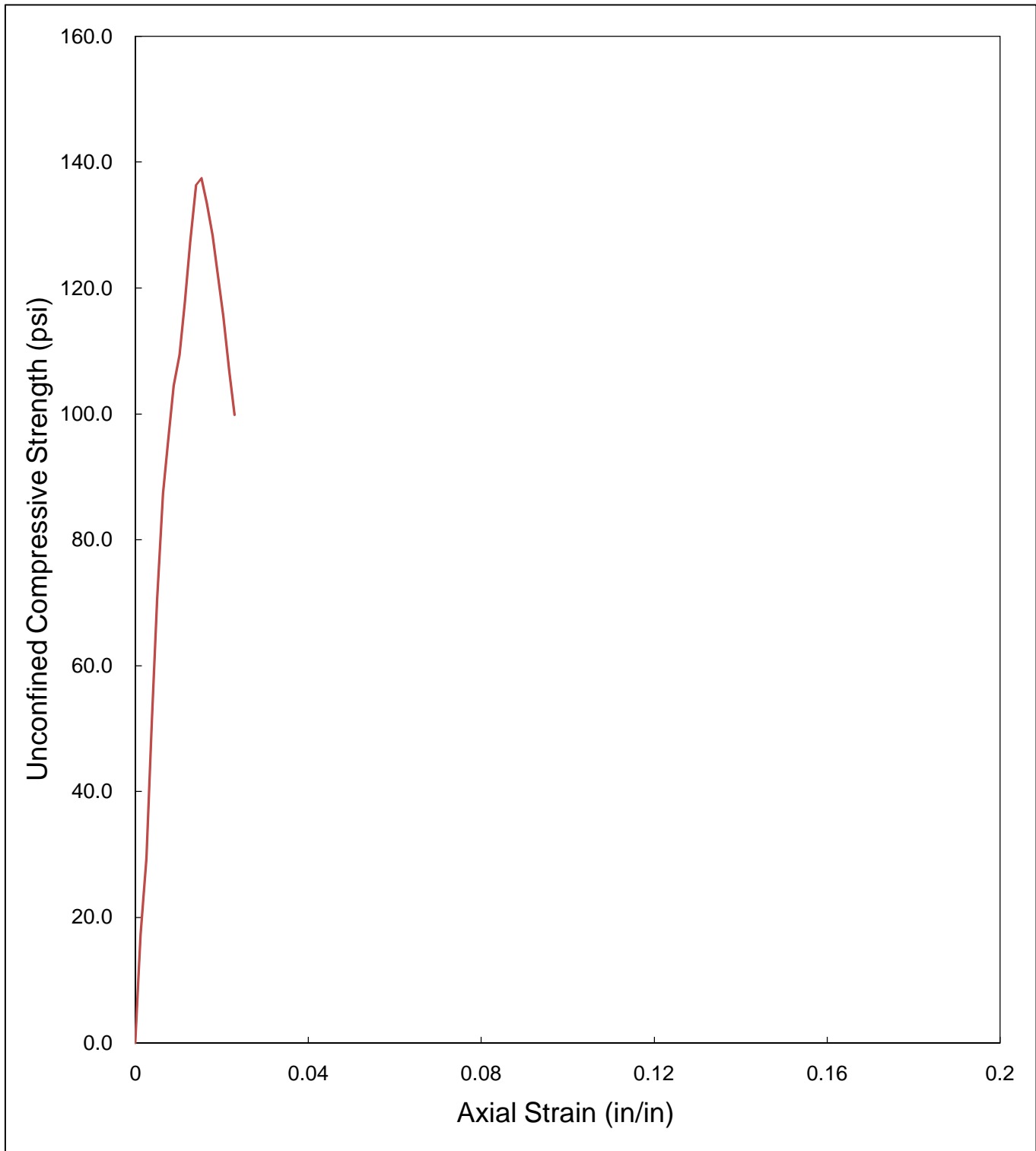
LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5818\_US

SOIL SPECIMEN DIMENSIONS		
	DIAMETER	LENGTH
No. 1	2.03 in.	3.92 in.
No. 2	1.99 in.	3.92 in.
No. 3	1.97 in.	3.92 in.
<b>Average</b>	<b>2.00 in.</b>	<b>3.92 in.</b>

[illegible]

# UNCONFINED COMPRESSION TESTING

Sample No. 0301-015 (7-Day)



# UNCONFINED COMPRESSION TEST

ASTM D 2166

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-015 (7-Day)  
TESTING DATE: 5/12/2009  
TESTED BY: SEM

LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5818\_US

TESTING PARAMETER AND RESULTS	
MOISTURE CONTENT	20.3 %
BULK UNIT WEIGHT	119.8 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	99.6 lb/ft <sup>3</sup>
UCS *	137.4 lb/in <sup>2</sup>

\* UCS - UNCONFINED COMPRESSIVE STRENGTH

## ASTM D 2166

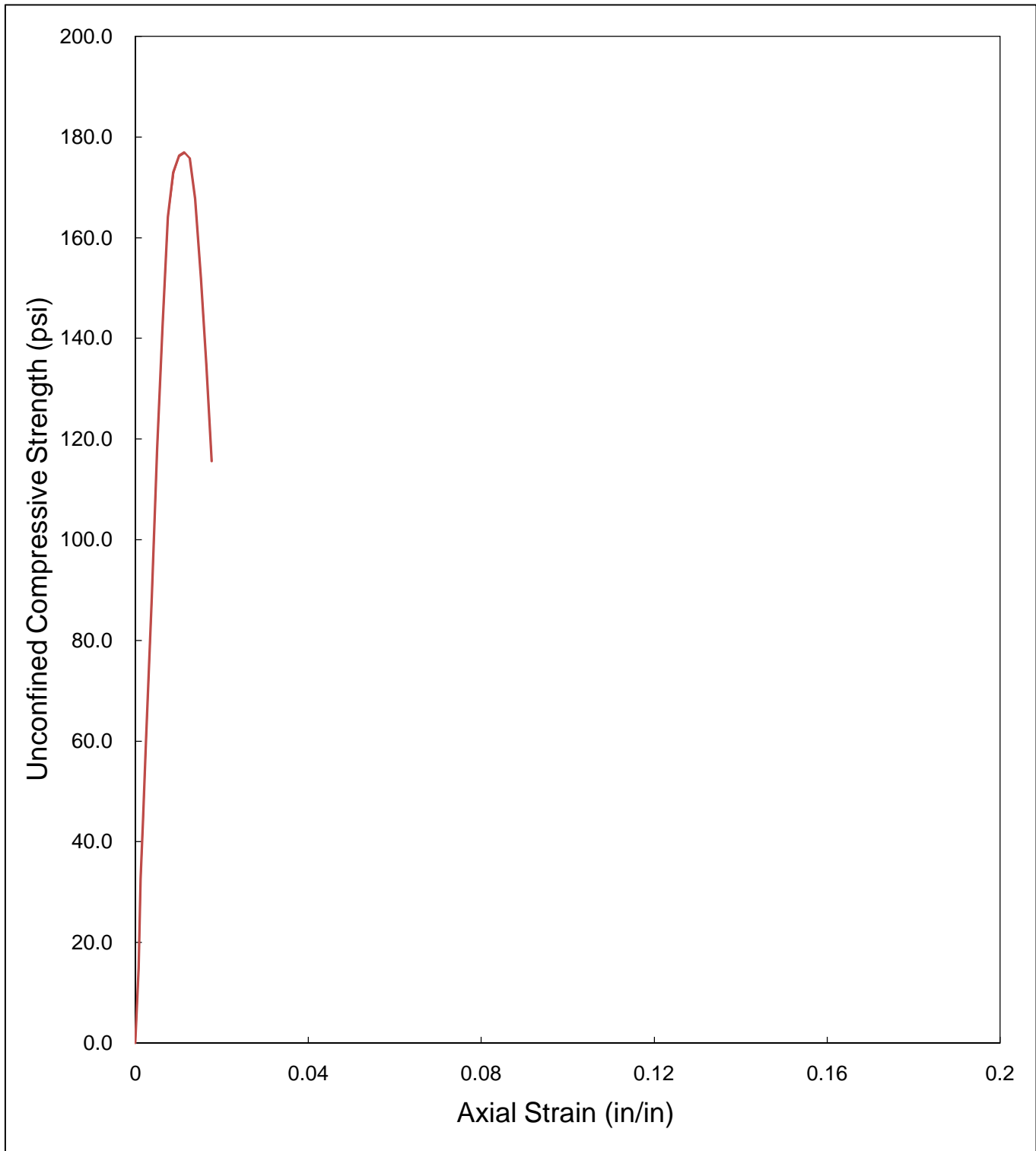
LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5843\_US

SOIL SPECIMEN DIMENSIONS		
	DIAMETER	LENGTH
No. 1	1.99 in.	3.95 in.
No. 2	2.01 in.	3.96 in.
No. 3	2.01 in.	3.97 in.
Average	2.00 in.	3.96 in.

[illegible]

# UNCONFINED COMPRESSION TESTING

Sample No. 0301-015 (14-Day)



# UNCONFINED COMPRESSION TEST

ASTM D 2166

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-015 (14-Day)  
TESTING DATE: 5/19/2009  
TESTED BY: SEM

LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5843\_US

TESTING PARAMETER AND RESULTS	
MOISTURE CONTENT	19.7 %
BULK UNIT WEIGHT	122.1 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	102.0 lb/ft <sup>3</sup>
UCS *	176.9 lb/in <sup>2</sup>

\* UCS - UNCONFINED COMPRESSIVE STRENGTH



# UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT: Norwich MGP  
 PROJECT No.: SE-0301  
 SAMPLE No.: 0301-015 (28 day)  
 TESTING DATE: 2-Jun-09  
 TESTED BY: MP

LOADING RATE: 0.04 in./min.  
 TRACKING CODE: 5889 US

MOISTURE CONTENT (Dry Basis)	
1. MOISTURE TIN NO.	0301-015
2. WT MOISTURE TIN (tare weight)	66.43 g
3. WT WET SOIL + TARE	168.73 g
4. WT DRY SOIL + TARE	152.02 g
5. WT WATER, Ww	16.71 g
6. WT DRY SOIL, Ws	85.59 g
7. MOISTURE CONTENT, W	19.52 %

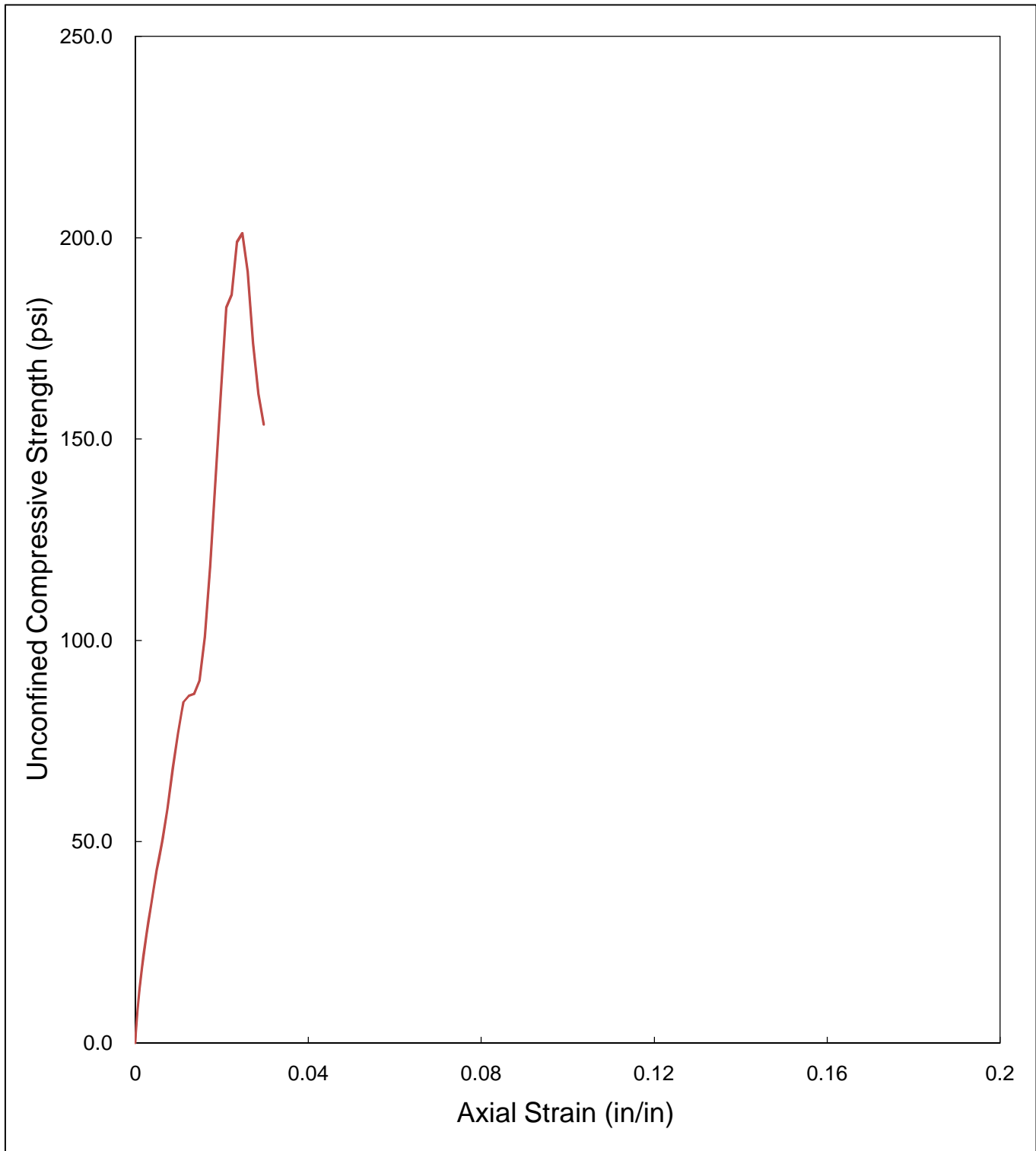
SOIL SPECIMEN DIMENSIONS		
	DIAMETER	LENGTH
No. 1	2.03 in.	4.04 in.
No. 2	1.95 in.	4.04 in.
No. 3	2.03 in.	4.04 in.
Average	2.00 in.	4.04 in.

SPECIMEN CONDITIONS	
Initial Specimen WT, Wo	386.75 g
Initial Area, Ao	3.15 in <sup>2</sup>
Initial Volume, Vo	12.73 in <sup>3</sup>
Initial Bulk Unit Weight,	115.7 lb/ft <sup>3</sup>
Initial Dry Unit Weight	96.8 lb/ft <sup>3</sup>
15 % Strain (0.15 Lo)	0.61 in.
UCS	201.1 lb/in <sup>2</sup>

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in <sup>2</sup> )	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in <sup>2</sup> )
0	0.000	0.000	3.152	0.0000	0.0
36	0.003	0.003	3.154	0.0007	11.4
49	0.005	0.005	3.156	0.0012	15.5
63	0.007	0.007	3.158	0.0017	20.0
83	0.010	0.010	3.160	0.0025	26.3
109	0.015	0.015	3.164	0.0037	34.5
136	0.020	0.020	3.168	0.0050	42.9
158	0.025	0.025	3.172	0.0062	49.8
184	0.030	0.030	3.176	0.0074	57.9
217	0.035	0.035	3.180	0.0087	68.2
245	0.040	0.040	3.184	0.0099	77.0
270	0.045	0.045	3.188	0.0111	84.7
275	0.050	0.050	3.192	0.0124	86.2
277	0.055	0.055	3.196	0.0136	86.7
288	0.060	0.060	3.200	0.0149	90.0
323	0.065	0.065	3.204	0.0161	100.8
380	0.070	0.070	3.208	0.0173	118.5
450	0.075	0.075	3.212	0.0186	140.1
520	0.080	0.080	3.216	0.0198	161.7
588	0.085	0.085	3.220	0.0210	182.6
599	0.090	0.090	3.224	0.0223	185.8
642	0.095	0.095	3.228	0.0235	198.9
650	0.100	0.100	3.232	0.0248	201.1
620	0.105	0.105	3.236	0.0260	191.6
563	0.110	0.110	3.240	0.0272	173.7
523	0.115	0.115	3.244	0.0285	161.2
499	0.120	0.120	3.249	0.0297	153.6

# UNCONFINED COMPRESSION TESTING

Sample No. 0301-015 (28 day)



# UNCONFINED COMPRESSION TEST

ASTM D 2166

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-015 (28 day)  
TESTING DATE: 6/2/2009  
TESTED BY: MP

LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5889 US

TESTING PARAMETER AND RESULTS	
MOISTURE CONTENT	19.5 %
BULK UNIT WEIGHT	115.7 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	96.8 lb/ft <sup>3</sup>
UCS *	201.1 lb/in <sup>2</sup>

\* UCS - UNCONFINED COMPRESSIVE STRENGTH

# UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT: Norwich MGP  
 PROJECT No.: SE-0301  
 SAMPLE No.: 0301-016 (7-Day)  
 TESTING DATE: 12-May-09  
 TESTED BY: SEM

LOADING RATE: 0.04 in./min.  
 TRACKING CODE: 5819\_US

MOISTURE CONTENT (Dry Basis)	
1. MOISTURE TIN NO.	0301-016
2. WT MOISTURE TIN (tare weight)	168.81 g
3. WT WET SOIL + TARE	286.71 g
4. WT DRY SOIL + TARE	265.23 g
5. WT WATER, Ww	21.48 g
6. WT DRY SOIL, Ws	96.42 g
7. MOISTURE CONTENT, W	22.28 %

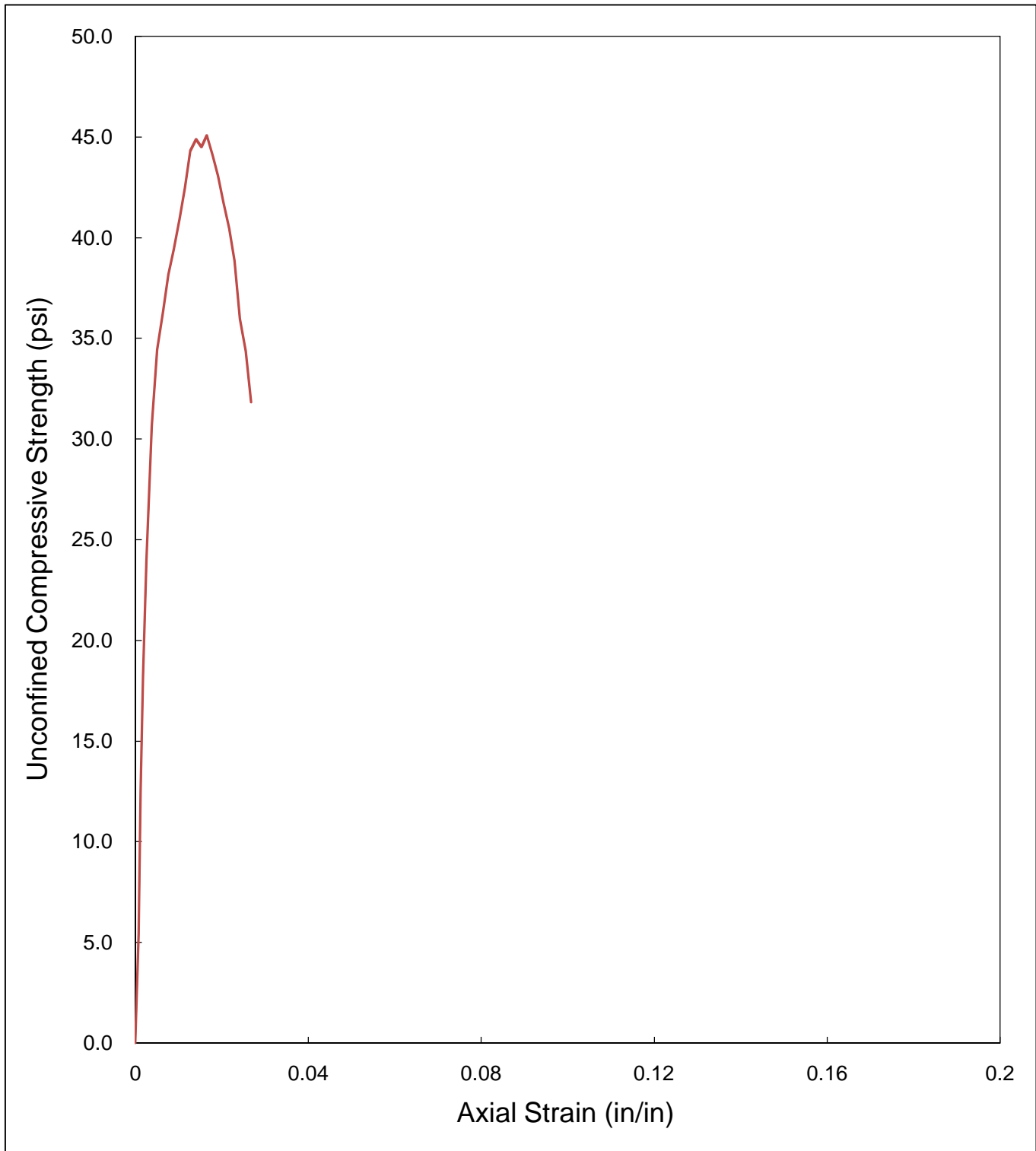
SOIL SPECIMEN DIMENSIONS		
	DIAMETER	LENGTH
No. 1	1.98 in.	3.92 in.
No. 2	2.00 in.	3.93 in.
No. 3	2.00 in.	3.93 in.
Average	1.99 in.	3.93 in.

SPECIMEN CONDITIONS	
Initial Specimen WT, Wo	398.53 g
Initial Area, Ao	3.12 in <sup>2</sup>
Initial Volume, Vo	12.25 in <sup>3</sup>
Initial Bulk Unit Weight,	123.9 lb/ft <sup>3</sup>
Initial Dry Unit Weight	101.3 lb/ft <sup>3</sup>
15 % Strain (0.15 Lo)	0.59 in.
UCS	45.1 lb/in <sup>2</sup>

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in <sup>2</sup> )	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in <sup>2</sup> )
0	0.000	0.000	3.121	0.0000	0.0
17	0.003	0.003	3.123	0.0008	5.4
39	0.005	0.005	3.125	0.0013	12.5
57	0.007	0.007	3.126	0.0018	18.2
75	0.010	0.010	3.129	0.0025	24.0
96	0.015	0.015	3.133	0.0038	30.6
108	0.020	0.020	3.137	0.0051	34.4
114	0.025	0.025	3.141	0.0064	36.3
120	0.030	0.030	3.145	0.0076	38.2
124	0.035	0.035	3.149	0.0089	39.4
129	0.040	0.040	3.153	0.0102	40.9
134	0.045	0.045	3.157	0.0115	42.4
140	0.050	0.050	3.161	0.0127	44.3
142	0.055	0.055	3.165	0.0140	44.9
141	0.060	0.060	3.169	0.0153	44.5
143	0.065	0.065	3.173	0.0166	45.1
140	0.070	0.070	3.177	0.0178	44.1
137	0.075	0.075	3.181	0.0191	43.1
133	0.080	0.080	3.186	0.0204	41.8
129	0.085	0.085	3.190	0.0216	40.4
124	0.090	0.090	3.194	0.0229	38.8
115	0.095	0.095	3.198	0.0242	36.0
110	0.100	0.100	3.202	0.0255	34.4
102	0.105	0.105	3.206	0.0267	31.8

# UNCONFINED COMPRESSION TESTING

Sample No. 0301-016 (7-Day)



# UNCONFINED COMPRESSION TEST

ASTM D 2166

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-016 (7-Day)  
TESTING DATE: 5/12/2009  
TESTED BY: SEM

LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5819\_US

TESTING PARAMETER AND RESULTS	
MOISTURE CONTENT	22.3 %
BULK UNIT WEIGHT	123.9 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	101.3 lb/ft <sup>3</sup>
UCS *	45.1 lb/in <sup>2</sup>

\* UCS - UNCONFINED COMPRESSIVE STRENGTH

# UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT: Norwich MGP  
 PROJECT No.: SE-0301  
 SAMPLE No.: 0301-016 (14-Day)  
 TESTING DATE: 19-May-09  
 TESTED BY: SEM

LOADING RATE: 0.04 in./min.  
 TRACKING CODE: 5844\_US

MOISTURE CONTENT (Dry Basis)	
1. MOISTURE TIN NO.	0301-016
2. WT MOISTURE TIN (tare weight)	62.31 g
3. WT WET SOIL + TARE	172.30 g
4. WT DRY SOIL + TARE	154.58 g
5. WT WATER, W <sub>w</sub>	17.72 g
6. WT DRY SOIL, W <sub>s</sub>	92.27 g
7. MOISTURE CONTENT, W	19.20 %

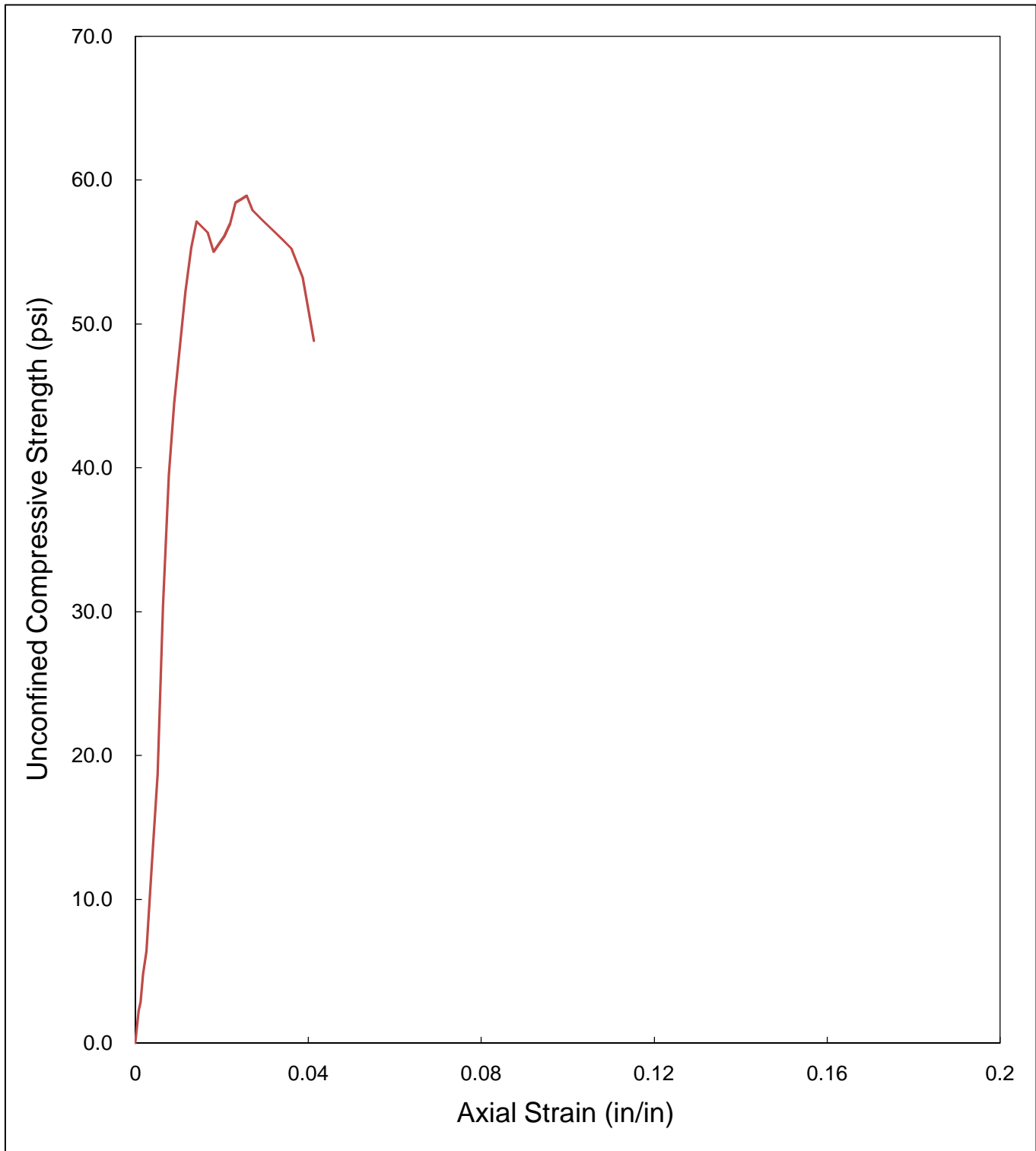
SOIL SPECIMEN DIMENSIONS		
	DIAMETER	LENGTH
No. 1	2.00 in.	3.86 in.
No. 2	2.00 in.	3.88 in.
No. 3	2.00 in.	3.88 in.
Average	2.00 in.	3.87 in.

SPECIMEN CONDITIONS	
Initial Specimen WT, W <sub>o</sub>	402.32 g
Initial Area, A <sub>o</sub>	3.14 in <sup>2</sup>
Initial Volume, V <sub>o</sub>	12.17 in <sup>3</sup>
Initial Bulk Unit Weight,	126.0 lb/ft <sup>3</sup>
Initial Dry Unit Weight	105.7 lb/ft <sup>3</sup>
15 % Strain (0.15 L <sub>o</sub> )	0.58 in.
UCS	58.9 lb/in <sup>2</sup>

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in <sup>2</sup> )	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in <sup>2</sup> )
0	0.000	0.000	3.142	0.0000	0.0
7	0.003	0.003	3.144	0.0008	2.2
9	0.005	0.005	3.146	0.0013	2.9
15	0.007	0.007	3.147	0.0018	4.8
20	0.010	0.010	3.150	0.0026	6.3
39	0.015	0.015	3.154	0.0039	12.4
59	0.020	0.020	3.158	0.0052	18.7
96	0.025	0.025	3.162	0.0065	30.4
125	0.030	0.030	3.166	0.0077	39.5
141	0.035	0.035	3.170	0.0090	44.5
154	0.040	0.040	3.174	0.0103	48.5
166	0.045	0.045	3.179	0.0116	52.2
176	0.050	0.050	3.183	0.0129	55.3
182	0.055	0.055	3.187	0.0142	57.1
181	0.060	0.060	3.191	0.0155	56.7
180	0.065	0.065	3.195	0.0168	56.3
176	0.070	0.070	3.199	0.0181	55.0
178	0.075	0.075	3.204	0.0194	55.6
180	0.080	0.080	3.208	0.0207	56.1
183	0.085	0.085	3.212	0.0219	57.0
188	0.090	0.090	3.216	0.0232	58.5
189	0.095	0.095	3.221	0.0245	58.7
190	0.100	0.100	3.225	0.0258	58.9
187	0.105	0.105	3.229	0.0271	57.9
186	0.110	0.110	3.233	0.0284	57.5
185	0.115	0.115	3.238	0.0297	57.1
184	0.120	0.120	3.242	0.0310	56.8
183	0.125	0.125	3.246	0.0323	56.4
180	0.140	0.140	3.259	0.0361	55.2
174	0.150	0.150	3.268	0.0387	53.2
160	0.160	0.160	3.277	0.0413	48.8

# UNCONFINED COMPRESSION TESTING

Sample No. 0301-016 (14-Day)





# UNCONFINED COMPRESSION TEST

ASTM D 2166

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-016 (14-Day)  
TESTING DATE: 5/19/2009  
TESTED BY: SEM

LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5844\_US

TESTING PARAMETER AND RESULTS	
MOISTURE CONTENT	19.2 %
BULK UNIT WEIGHT	126.0 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	105.7 lb/ft <sup>3</sup>
UCS *	58.9 lb/in <sup>2</sup>

\* UCS - UNCONFINED COMPRESSIVE STRENGTH

# UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT: Norwich MGP  
 PROJECT No.: SE-0301  
 SAMPLE No.: 0301-016 (28 day)  
 TESTING DATE: 2-Jun-09  
 TESTED BY: MP

LOADING RATE: 0.04 in./min.  
 TRACKING CODE: 5890 US

MOISTURE CONTENT (Dry Basis)	
1. MOISTURE TIN NO.	0301-016
2. WT MOISTURE TIN (tare weight)	70.85 g
3. WT WET SOIL + TARE	183.63 g
4. WT DRY SOIL + TARE	163.04 g
5. WT WATER, Ww	20.59 g
6. WT DRY SOIL, Ws	92.19 g
7. MOISTURE CONTENT, W	22.33 %

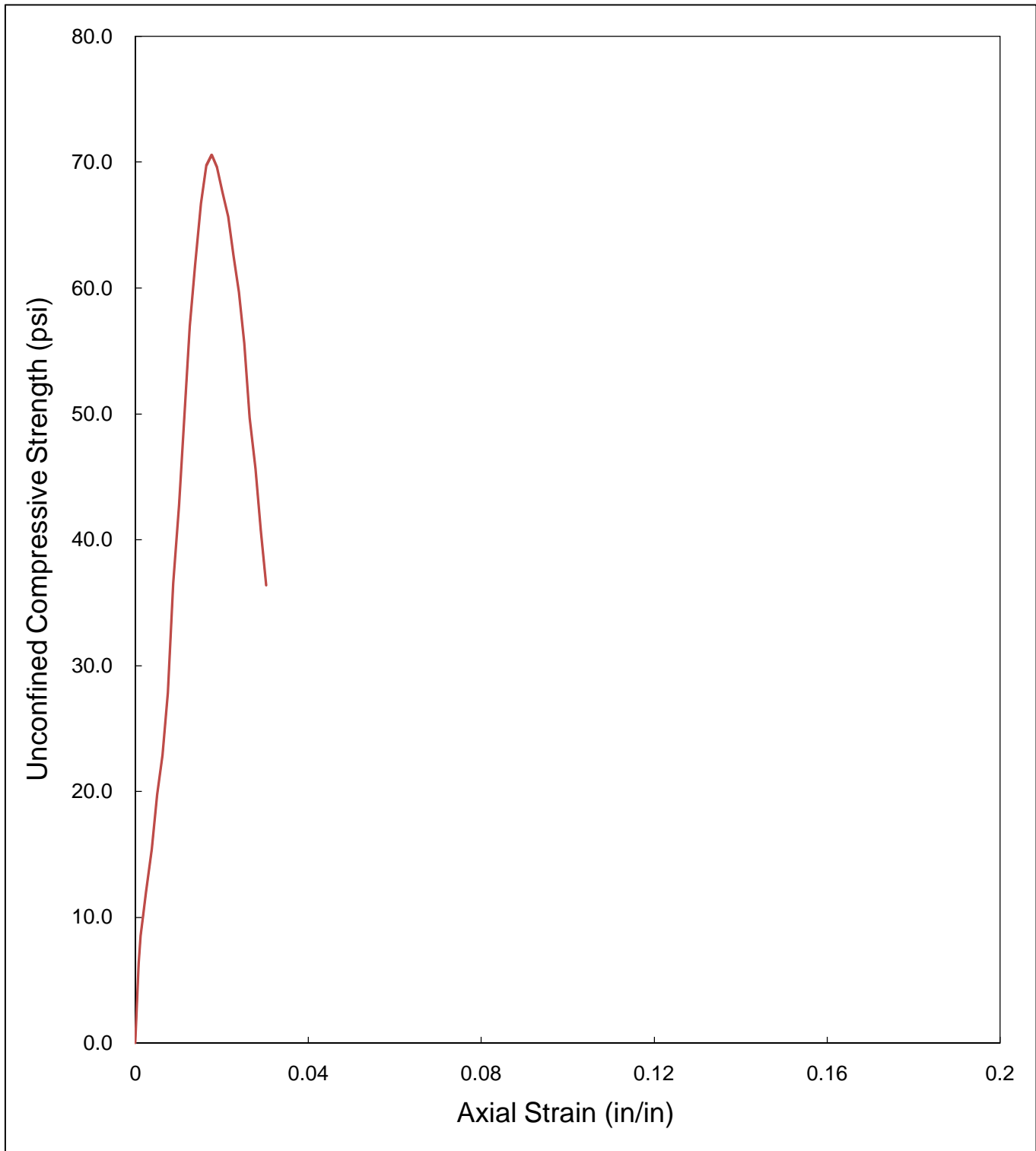
SOIL SPECIMEN DIMENSIONS		
	DIAMETER	LENGTH
No. 1	2.01 in.	4.00 in.
No. 2	2.01 in.	3.96 in.
No. 3	2.01 in.	3.96 in.
Average	2.01 in.	3.97 in.

SPECIMEN CONDITIONS	
Initial Specimen WT, Wo	413.22 g
Initial Area, Ao	3.17 in <sup>2</sup>
Initial Volume, Vo	12.61 in <sup>3</sup>
Initial Bulk Unit Weight,	124.9 lb/ft <sup>3</sup>
Initial Dry Unit Weight	102.1 lb/ft <sup>3</sup>
15 % Strain (0.15 Lo)	0.60 in.
UCS	70.6 lb/in <sup>2</sup>

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in <sup>2</sup> )	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in <sup>2</sup> )
0	0.000	0.000	3.173	0.0000	0.0
20	0.003	0.003	3.175	0.0008	6.3
27	0.005	0.005	3.177	0.0013	8.5
32	0.007	0.007	3.179	0.0018	10.1
38	0.010	0.010	3.181	0.0025	11.9
49	0.015	0.015	3.185	0.0038	15.4
63	0.020	0.020	3.189	0.0050	19.8
73	0.025	0.025	3.193	0.0063	22.9
89	0.030	0.030	3.197	0.0076	27.8
117	0.035	0.035	3.201	0.0088	36.5
137	0.040	0.040	3.205	0.0101	42.7
160	0.045	0.045	3.209	0.0113	49.9
183	0.050	0.050	3.214	0.0126	56.9
199	0.055	0.055	3.218	0.0138	61.8
215	0.060	0.060	3.222	0.0151	66.7
225	0.065	0.065	3.226	0.0164	69.7
228	0.070	0.070	3.230	0.0176	70.6
225	0.075	0.075	3.234	0.0189	69.6
219	0.080	0.080	3.238	0.0201	67.6
213	0.085	0.085	3.242	0.0214	65.7
203	0.090	0.090	3.247	0.0227	62.5
194	0.095	0.095	3.251	0.0239	59.7
181	0.100	0.100	3.255	0.0252	55.6
162	0.105	0.105	3.259	0.0264	49.7
149	0.110	0.110	3.263	0.0277	45.7
133	0.115	0.115	3.268	0.0289	40.7
119	0.120	0.120	3.272	0.0302	36.4

# UNCONFINED COMPRESSION TESTING

Sample No. 0301-016 (28 day)



# UNCONFINED COMPRESSION TEST

ASTM D 2166

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-016 (28 day)  
TESTING DATE: 6/2/2009  
TESTED BY: MP

LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5890 US

TESTING PARAMETER AND RESULTS	
MOISTURE CONTENT	22.3 %
BULK UNIT WEIGHT	124.9 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	102.1 lb/ft <sup>3</sup>
UCS *	70.6 lb/in <sup>2</sup>

\* UCS - UNCONFINED COMPRESSIVE STRENGTH

# UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT: Norwich MGP  
 PROJECT No.: SE-0301  
 SAMPLE No.: 0301-017 (7-Day)  
 TESTING DATE: 14-May-09  
 TESTED BY: SEM

LOADING RATE: 0.04 in./min.  
 TRACKING CODE: 5829\_US

MOISTURE CONTENT (Dry Basis)	
1. MOISTURE TIN NO.	0301-017
2. WT MOISTURE TIN (tare weight)	67.64 g
3. WT WET SOIL + TARE	156.72 g
4. WT DRY SOIL + TARE	138.77 g
5. WT WATER, W <sub>w</sub>	17.95 g
6. WT DRY SOIL, W <sub>s</sub>	71.13 g
7. MOISTURE CONTENT, W	25.24 %

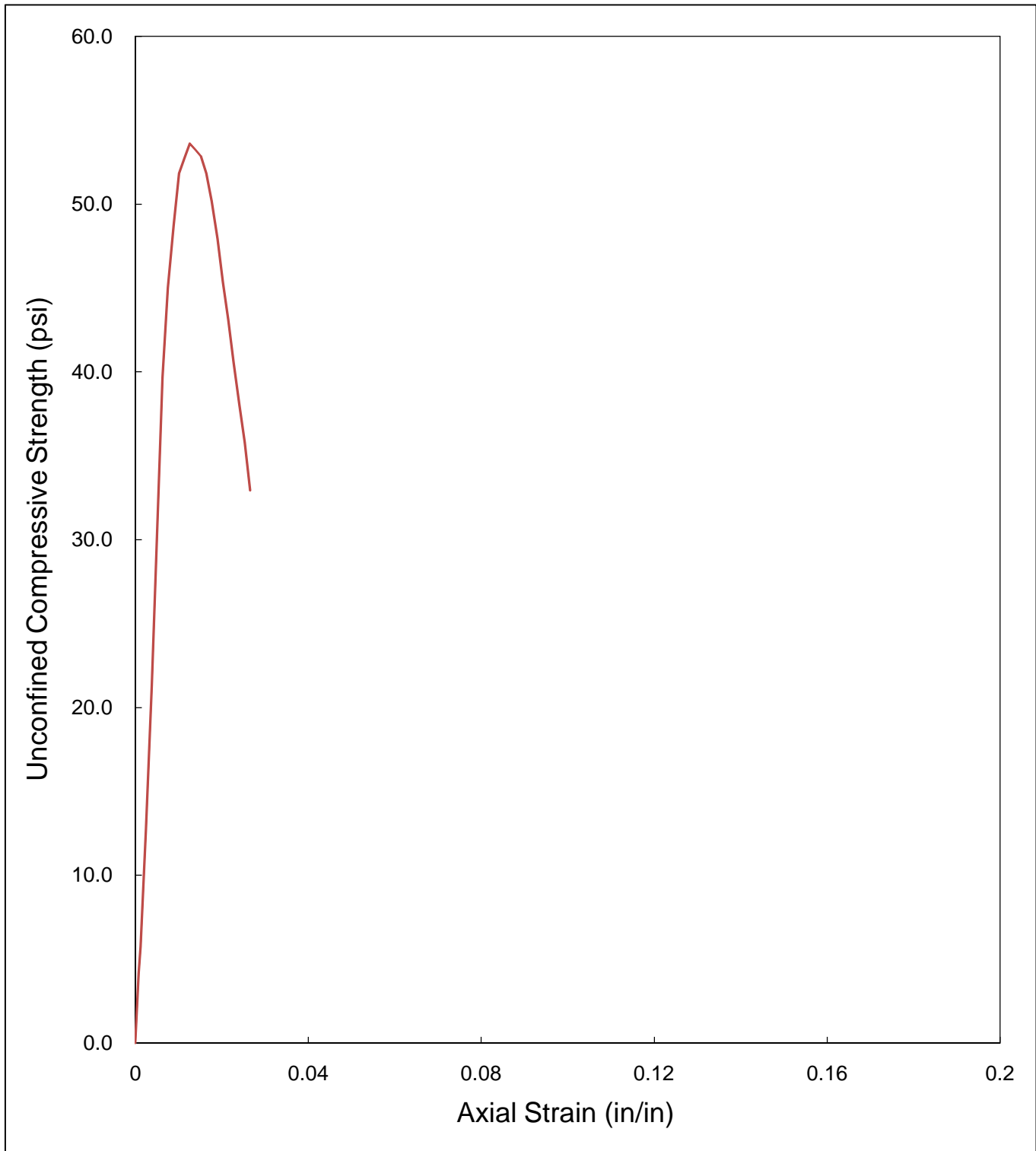
SOIL SPECIMEN DIMENSIONS		
	DIAMETER	LENGTH
No. 1	1.99 in.	3.95 in.
No. 2	2.00 in.	3.97 in.
No. 3	2.00 in.	3.97 in.
Average	2.00 in.	3.96 in.

SPECIMEN CONDITIONS	
Initial Specimen WT, W <sub>o</sub>	394.28 g
Initial Area, A <sub>o</sub>	3.13 in <sup>2</sup>
Initial Volume, V <sub>o</sub>	12.41 in <sup>3</sup>
Initial Bulk Unit Weight,	121.0 lb/ft <sup>3</sup>
Initial Dry Unit Weight	96.6 lb/ft <sup>3</sup>
15 % Strain (0.15 L <sub>o</sub> )	0.59 in.
UCS	53.6 lb/in <sup>2</sup>

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in <sup>2</sup> )	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in <sup>2</sup> )
0	0.000	0.000	3.131	0.0000	0.0
13	0.003	0.003	3.134	0.0008	4.1
18	0.005	0.005	3.135	0.0013	5.7
28	0.007	0.007	3.137	0.0018	8.9
40	0.010	0.010	3.139	0.0025	12.7
67	0.015	0.015	3.143	0.0038	21.3
96	0.020	0.020	3.147	0.0050	30.5
125	0.025	0.025	3.151	0.0063	39.7
142	0.030	0.030	3.155	0.0076	45.0
154	0.035	0.035	3.159	0.0088	48.7
164	0.040	0.040	3.163	0.0101	51.8
167	0.045	0.045	3.167	0.0114	52.7
170	0.050	0.050	3.171	0.0126	53.6
169	0.055	0.055	3.175	0.0139	53.2
168	0.060	0.060	3.179	0.0151	52.8
165	0.065	0.065	3.183	0.0164	51.8
160	0.070	0.070	3.187	0.0177	50.2
153	0.075	0.075	3.192	0.0189	47.9
145	0.080	0.080	3.196	0.0202	45.4
138	0.085	0.085	3.200	0.0214	43.1
130	0.090	0.090	3.204	0.0227	40.6
122	0.095	0.095	3.208	0.0240	38.0
115	0.100	0.100	3.212	0.0252	35.8
106	0.105	0.105	3.216	0.0265	33.0

# UNCONFINED COMPRESSION TESTING

Sample No. 0301-017 (7-Day)



# UNCONFINED COMPRESSION TEST

ASTM D 2166

## SUMMARY OF RESULTS

PROJECT:	Norwich MGP		
PROJECT No.:	SE-0301		
SAMPLE No.:	0301-017 (7-Day)		
TESTING DATE:	5/14/2009	LOADING RATE:	0.04 in./min.
TESTED BY:	SEM	TRACKING CODE:	5829_US

TESTING PARAMETER AND RESULTS	
MOISTURE CONTENT	25.2 %
BULK UNIT WEIGHT	121.0 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	96.6 lb/ft <sup>3</sup>
UCS *	53.6 lb/in <sup>2</sup>

\* UCS - UNCONFINED COMPRESSIVE STRENGTH

## ASTM D 2166

LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5860 US

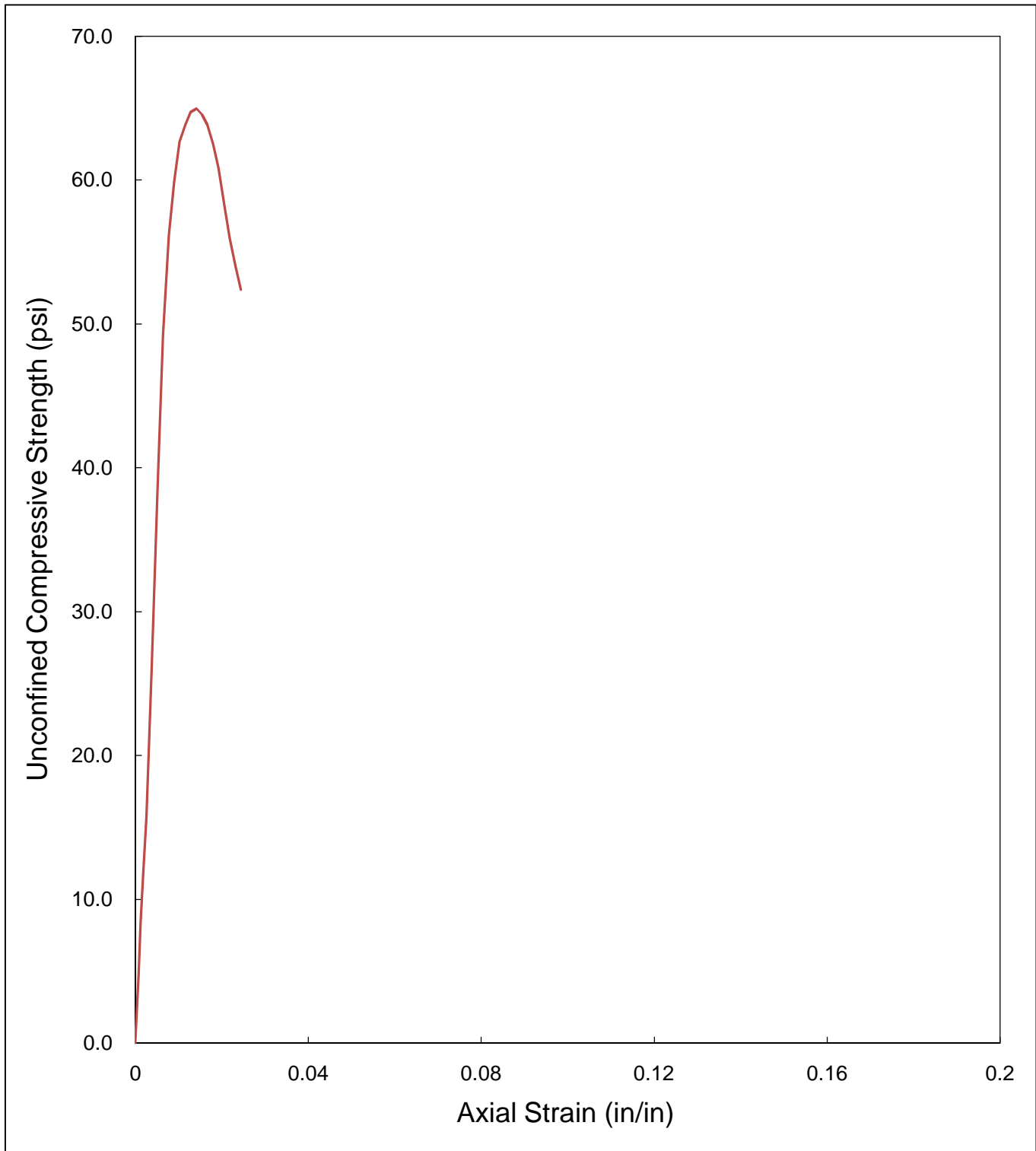
SOIL SPECIMEN DIMENSIONS		
	DIAMETER	LENGTH
No. 1	1.98 in.	3.89 in.
No. 2	1.99 in.	3.90 in.
No. 3	2.00 in.	3.90 in.
<b>Average</b>	<b>1.99 in.</b>	<b>3.90 in.</b>

[illegible]



# UNCONFINED COMPRESSION TESTING

Sample No. 0301-017 (14-Day)



# UNCONFINED COMPRESSION TEST

ASTM D 2166

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-017 (14-Day)  
TESTING DATE: 5/21/2009  
TESTED BY: SEM

LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5860\_US

TESTING PARAMETER AND RESULTS	
MOISTURE CONTENT	24.5 %
BULK UNIT WEIGHT	122.5 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	98.4 lb/ft <sup>3</sup>
UCS *	65.0 lb/in <sup>2</sup>

\* UCS - UNCONFINED COMPRESSIVE STRENGTH

## ASTM D 2166

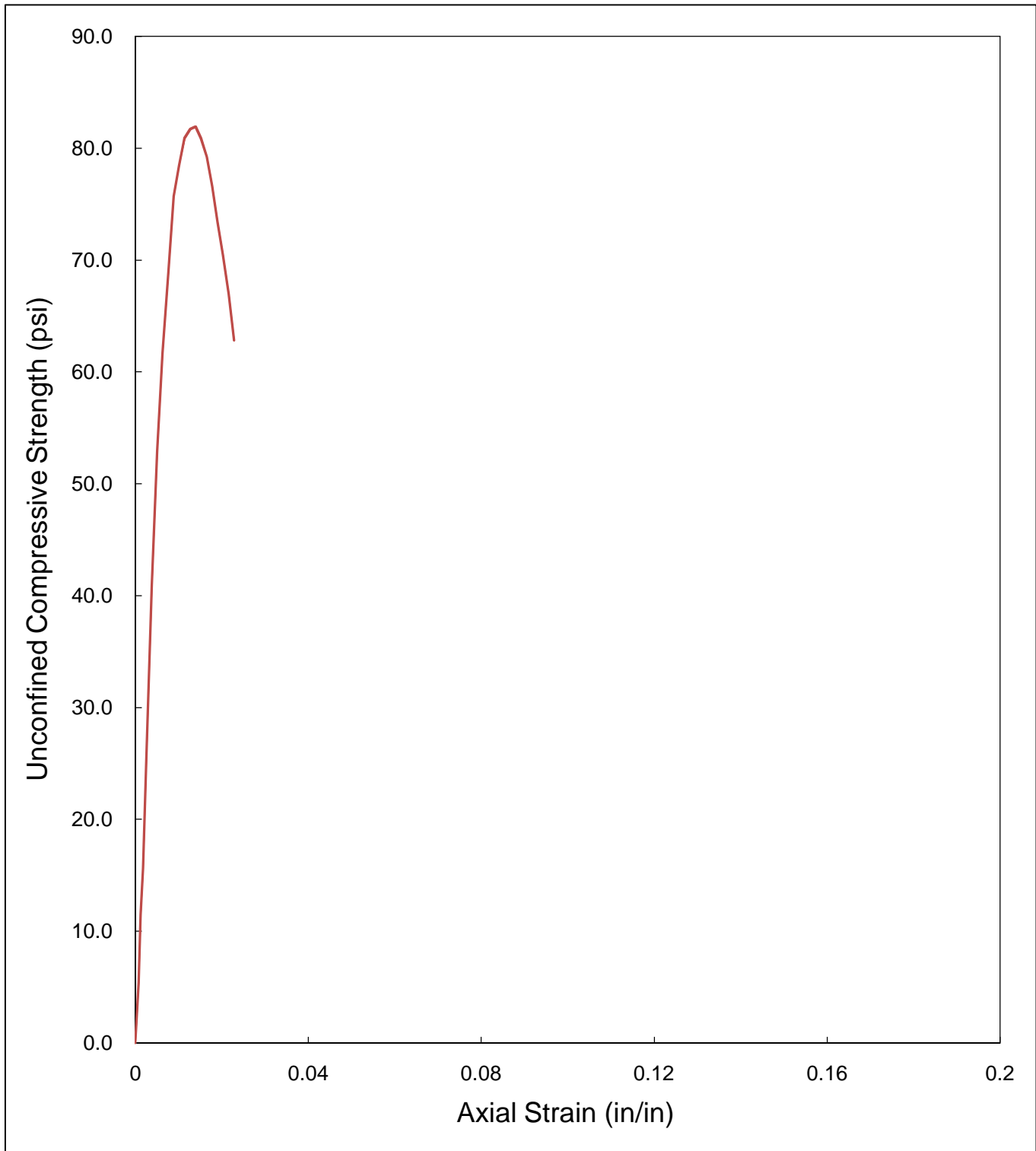
LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5912\_US

SOIL SPECIMEN DIMENSIONS		
	DIAMETER	LENGTH
No. 1	2.00 in.	3.94 in.
No. 2	2.00 in.	3.94 in.
No. 3	2.00 in.	3.95 in.
Average	2.00 in.	3.94 in.

[illegible]

# UNCONFINED COMPRESSION TESTING

Sample No. 0301-017 (28 day)



# UNCONFINED COMPRESSION TEST

ASTM D 2166

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-017 (28 day)  
TESTING DATE: 6/4/2009  
TESTED BY: SEM

LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5912\_US

TESTING PARAMETER AND RESULTS	
MOISTURE CONTENT	21.0 %
BULK UNIT WEIGHT	123.2 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	101.8 lb/ft <sup>3</sup>
UCS *	81.9 lb/in <sup>2</sup>

\* UCS - UNCONFINED COMPRESSIVE STRENGTH

## ASTM D 2166

LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5825 US

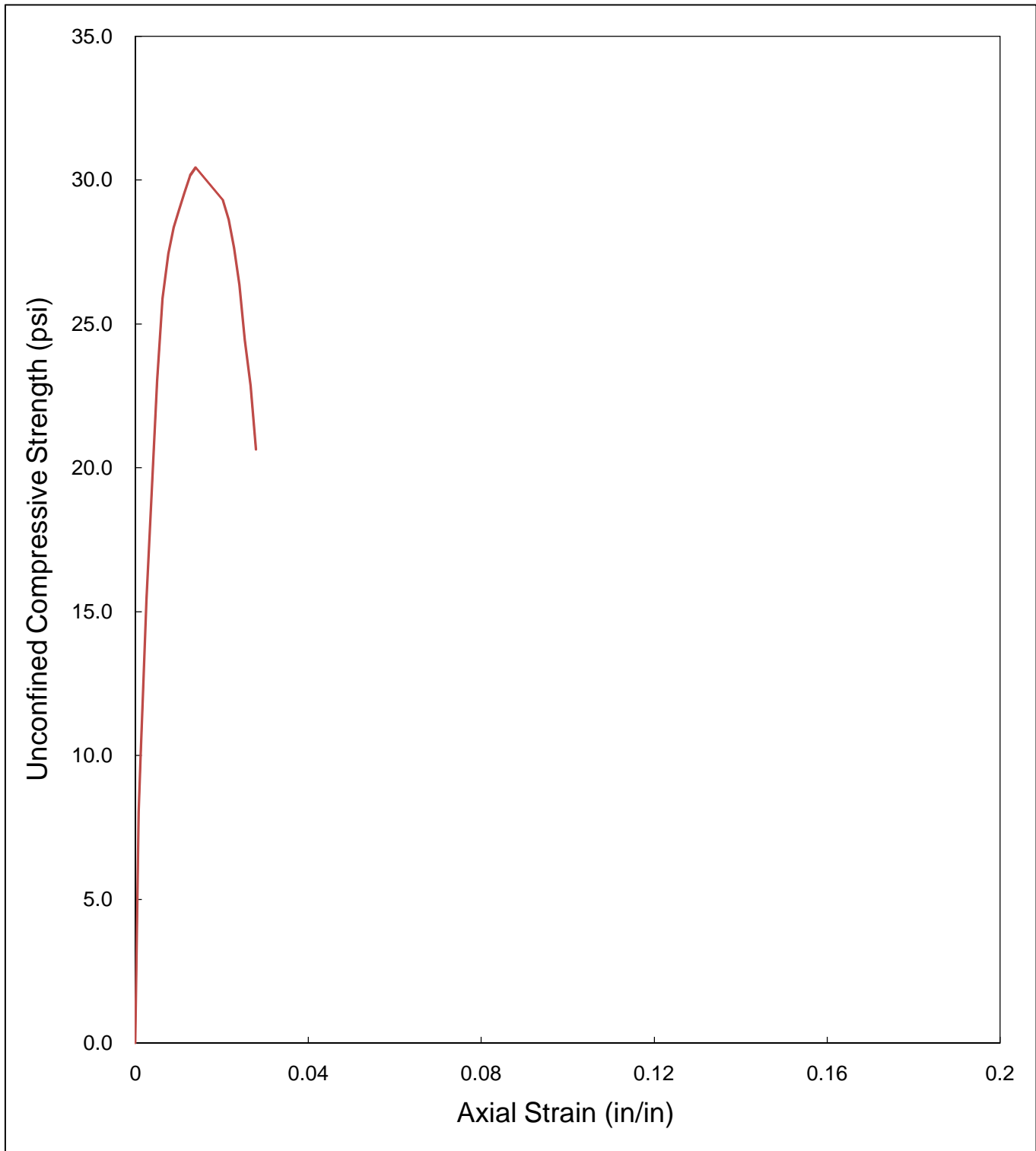
SOIL SPECIMEN DIMENSIONS		
	DIAMETER	LENGTH
No. 1	1.99 in.	3.94 in.
No. 2	2.00 in.	3.96 in.
No. 3	1.98 in.	3.94 in.
<b>Average</b>	<b>1.99 in.</b>	<b>3.95 in.</b>

SPECIMEN CONDITIONS	
<b>Initial Specimen WT, Wo</b>	<b>392.82 g</b>
Initial Area, Ao	3.11 in <sup>2</sup>
Initial Volume, Vo	12.28 in <sup>3</sup>
Initial Bulk Unit Weight,	121.9 lb/ft <sup>3</sup>
Initial Dry Unit Weight	95.3 lb/ft <sup>3</sup>
15 % Strain (0.15 Lo)	0.59 in.
UCS	30.4 lb/in <sup>2</sup>

[illegible]

# UNCONFINED COMPRESSION TESTING

Sample No. 0301-018 (7-Day)



# UNCONFINED COMPRESSION TEST

ASTM D 2166

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-018 (7-Day)  
TESTING DATE: 5/13/2009  
TESTED BY: RSL

LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5825\_US

TESTING PARAMETER AND RESULTS	
MOISTURE CONTENT	27.9 %
BULK UNIT WEIGHT	121.9 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	95.3 lb/ft <sup>3</sup>
UCS *	30.4 lb/in <sup>2</sup>

\* UCS - UNCONFINED COMPRESSIVE STRENGTH



# UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT: Norwich MGP  
 PROJECT No.: SE-0301  
 SAMPLE No.: 0301-018 (14-Day)  
 TESTING DATE: 20-May-09  
 TESTED BY: KG

LOADING RATE: 0.04 in./min.  
 TRACKING CODE: 5848\_US

MOISTURE CONTENT (Dry Basis)	
1. MOISTURE TIN NO.	0301-018
2. WT MOISTURE TIN (tare weight)	70.80 g
3. WT WET SOIL + TARE	134.80 g
4. WT DRY SOIL + TARE	121.95 g
5. WT WATER, Ww	12.85 g
6. WT DRY SOIL, Ws	51.15 g
7. MOISTURE CONTENT, W	25.12 %

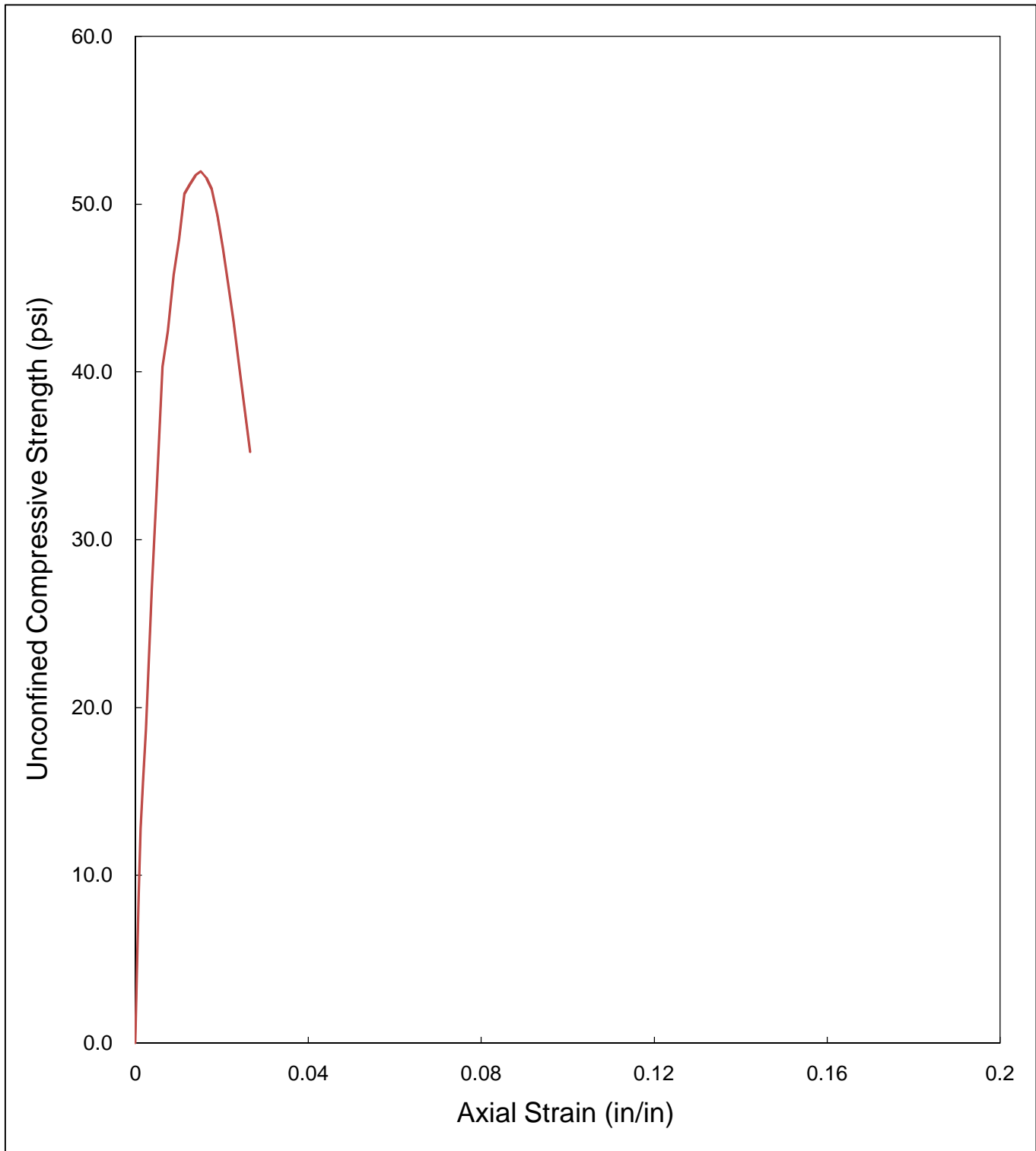
SOIL SPECIMEN DIMENSIONS		
	DIAMETER	LENGTH
No. 1	2.00 in.	3.97 in.
No. 2	2.02 in.	3.96 in.
No. 3	2.04 in.	3.96 in.
Average	2.02 in.	3.96 in.

SPECIMEN CONDITIONS	
Initial Specimen WT, Wo	394.96 g
Initial Area, Ao	3.20 in <sup>2</sup>
Initial Volume, Vo	12.70 in <sup>3</sup>
Initial Bulk Unit Weight,	118.5 lb/ft <sup>3</sup>
Initial Dry Unit Weight	94.7 lb/ft <sup>3</sup>
15 % Strain (0.15 Lo)	0.59 in.
UCS	51.9 lb/in <sup>2</sup>

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in <sup>2</sup> )	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in <sup>2</sup> )
0	0.000	0.000	3.205	0.0000	0.0
28	0.003	0.003	3.207	0.0008	8.7
41	0.005	0.005	3.209	0.0013	12.8
50	0.007	0.007	3.210	0.0018	15.6
60	0.010	0.010	3.213	0.0025	18.7
87	0.015	0.015	3.217	0.0038	27.0
108	0.020	0.020	3.221	0.0050	33.5
130	0.025	0.025	3.225	0.0063	40.3
137	0.030	0.030	3.229	0.0076	42.4
148	0.035	0.035	3.233	0.0088	45.8
155	0.040	0.040	3.237	0.0101	47.9
164	0.045	0.045	3.242	0.0114	50.6
166	0.050	0.050	3.246	0.0126	51.1
168	0.055	0.055	3.250	0.0139	51.7
169	0.060	0.060	3.254	0.0151	51.9
168	0.065	0.065	3.258	0.0164	51.6
166	0.070	0.070	3.262	0.0177	50.9
161	0.075	0.075	3.267	0.0189	49.3
155	0.080	0.080	3.271	0.0202	47.4
148	0.085	0.085	3.275	0.0214	45.2
141	0.090	0.090	3.279	0.0227	43.0
132	0.095	0.095	3.283	0.0240	40.2
124	0.100	0.100	3.288	0.0252	37.7
116	0.105	0.105	3.292	0.0265	35.2

# UNCONFINED COMPRESSION TESTING

Sample No. 0301-018 (14-Day)



# UNCONFINED COMPRESSION TEST

ASTM D 2166

## SUMMARY OF RESULTS

PROJECT:	Norwich MGP		
PROJECT No.:	SE-0301		
SAMPLE No.:	0301-018 (14-Day)		
TESTING DATE:	5/20/2009	LOADING RATE:	0.04 in./min.
TESTED BY:	KG	TRACKING CODE:	5848_US

TESTING PARAMETER AND RESULTS	
MOISTURE CONTENT	25.1 %
BULK UNIT WEIGHT	118.5 lb/ft³
DRY UNIT WEIGHT	94.7 lb/ft³
UCS *	51.9 lb/in²

\* UCS - UNCONFINED COMPRESSIVE STRENGTH

## ASTM D 2166

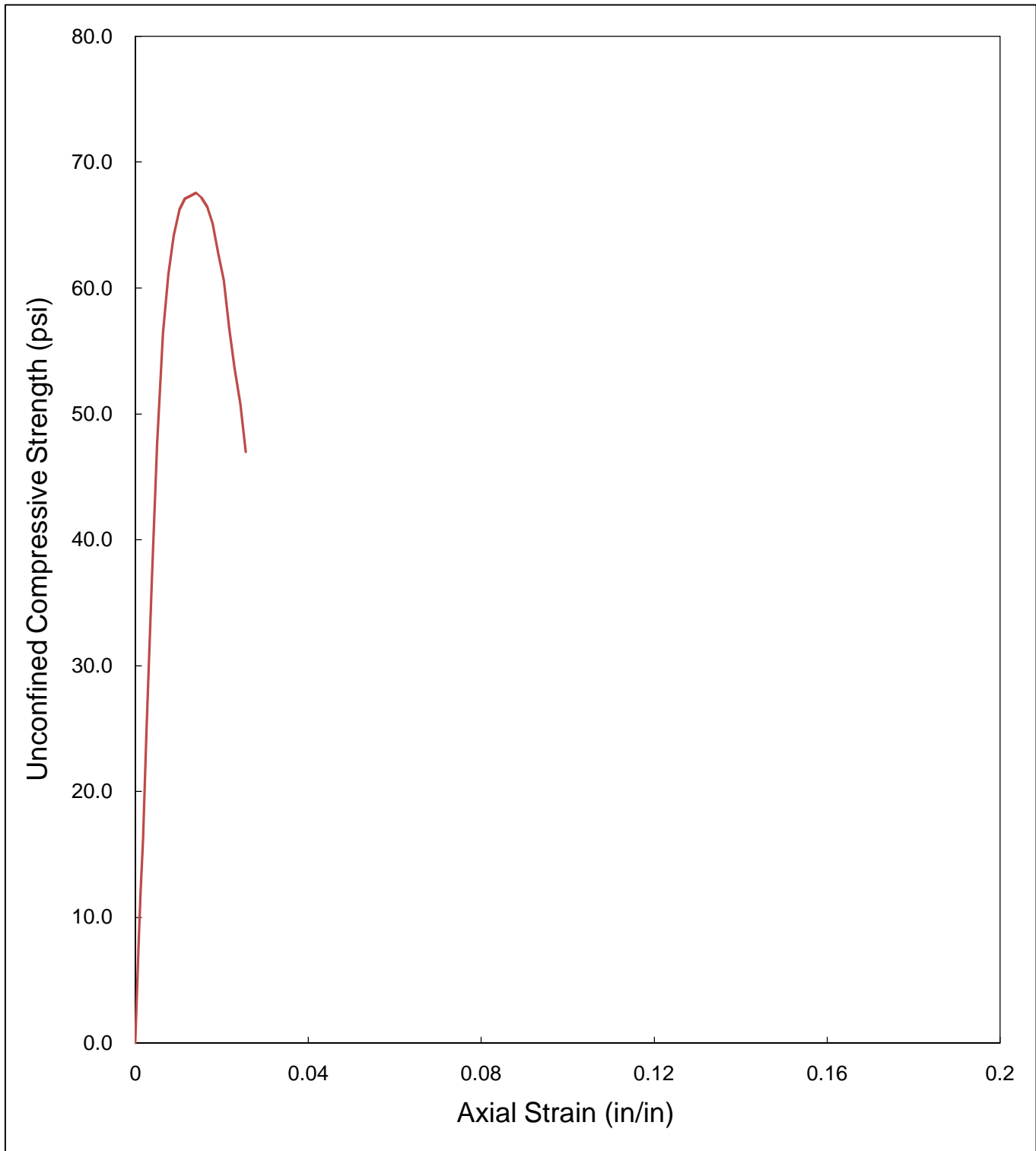
LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5908\_US

SOIL SPECIMEN DIMENSIONS		
	DIAMETER	LENGTH
No. 1	2.01 in.	3.91 in.
No. 2	2.00 in.	3.92 in.
No. 3	2.00 in.	3.93 in.
<b>Average</b>	<b>2.00 in.</b>	<b>3.92 in.</b>

[illegible]

# UNCONFINED COMPRESSION TESTING

Sample No. 0301-018 (28 day)



# UNCONFINED COMPRESSION TEST

ASTM D 2166

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-018 (28 day)  
TESTING DATE: 6/3/2009  
TESTED BY: KG

LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5908\_US

TESTING PARAMETER AND RESULTS	
MOISTURE CONTENT	32.1 %
BULK UNIT WEIGHT	116.0 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	87.8 lb/ft <sup>3</sup>
UCS *	67.6 lb/in <sup>2</sup>

\* UCS - UNCONFINED COMPRESSIVE STRENGTH

## ASTM D 2166

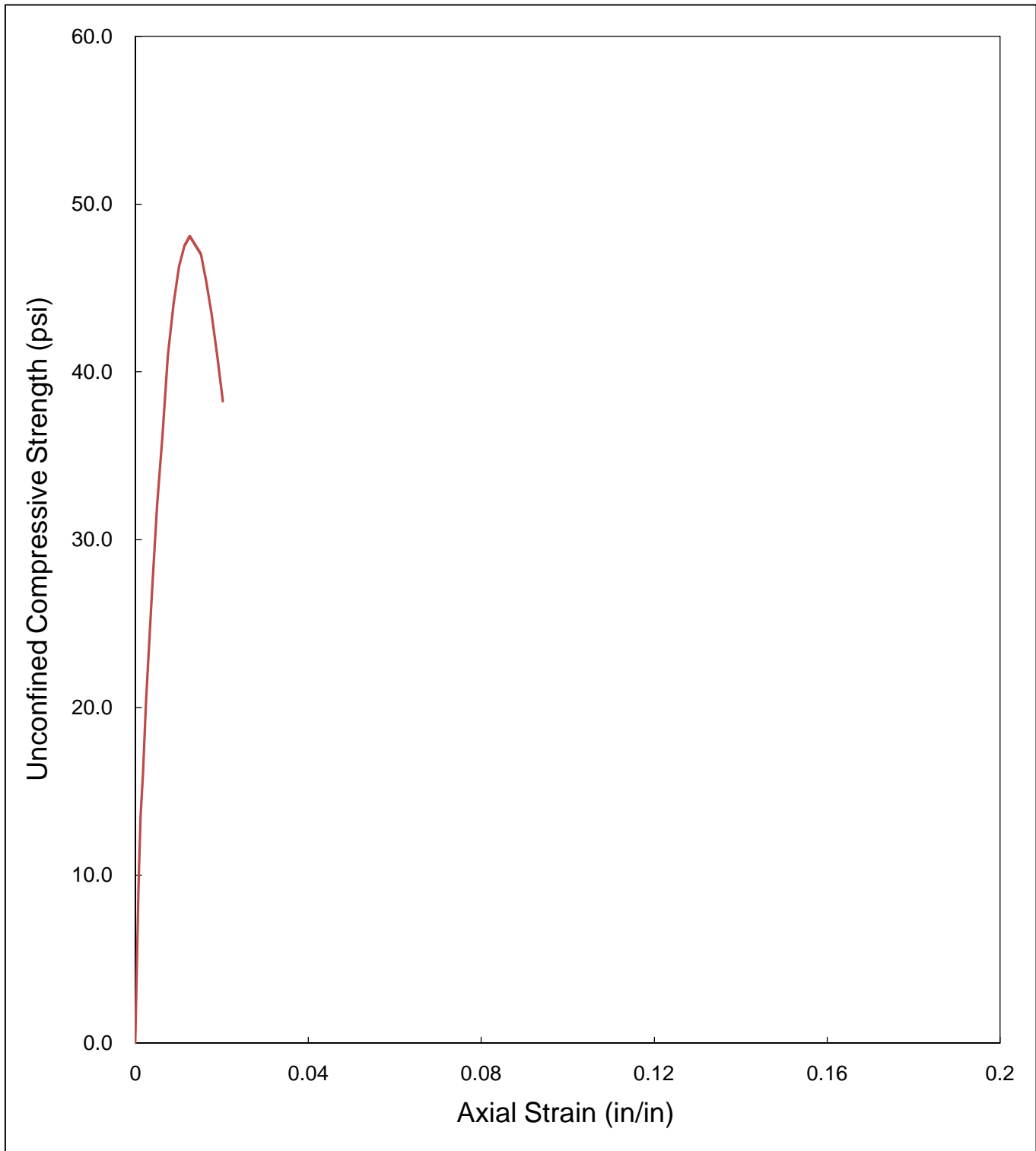
LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5826\_US

SOIL SPECIMEN DIMENSIONS		
	DIAMETER	LENGTH
No. 1	1.99 in.	3.97 in.
No. 2	1.98 in.	3.95 in.
No. 3	1.99 in.	3.95 in.
<b>Average</b>	<b>1.99 in.</b>	<b>3.96 in.</b>

[illegible]

# UNCONFINED COMPRESSION TESTING

Sample No. 0301-019 (7-Day)





# UNCONFINED COMPRESSION TEST

ASTM D 2166

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-019 (7-Day)  
TESTING DATE: 5/13/2009  
TESTED BY: RSL

LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5826\_US

TESTING PARAMETER AND RESULTS	
MOISTURE CONTENT	24.7 %
BULK UNIT WEIGHT	122.1 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	97.9 lb/ft <sup>3</sup>
UCS *	48.1 lb/in <sup>2</sup>

\* UCS - UNCONFINED COMPRESSIVE STRENGTH

## ASTM D 2166

LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5849 US

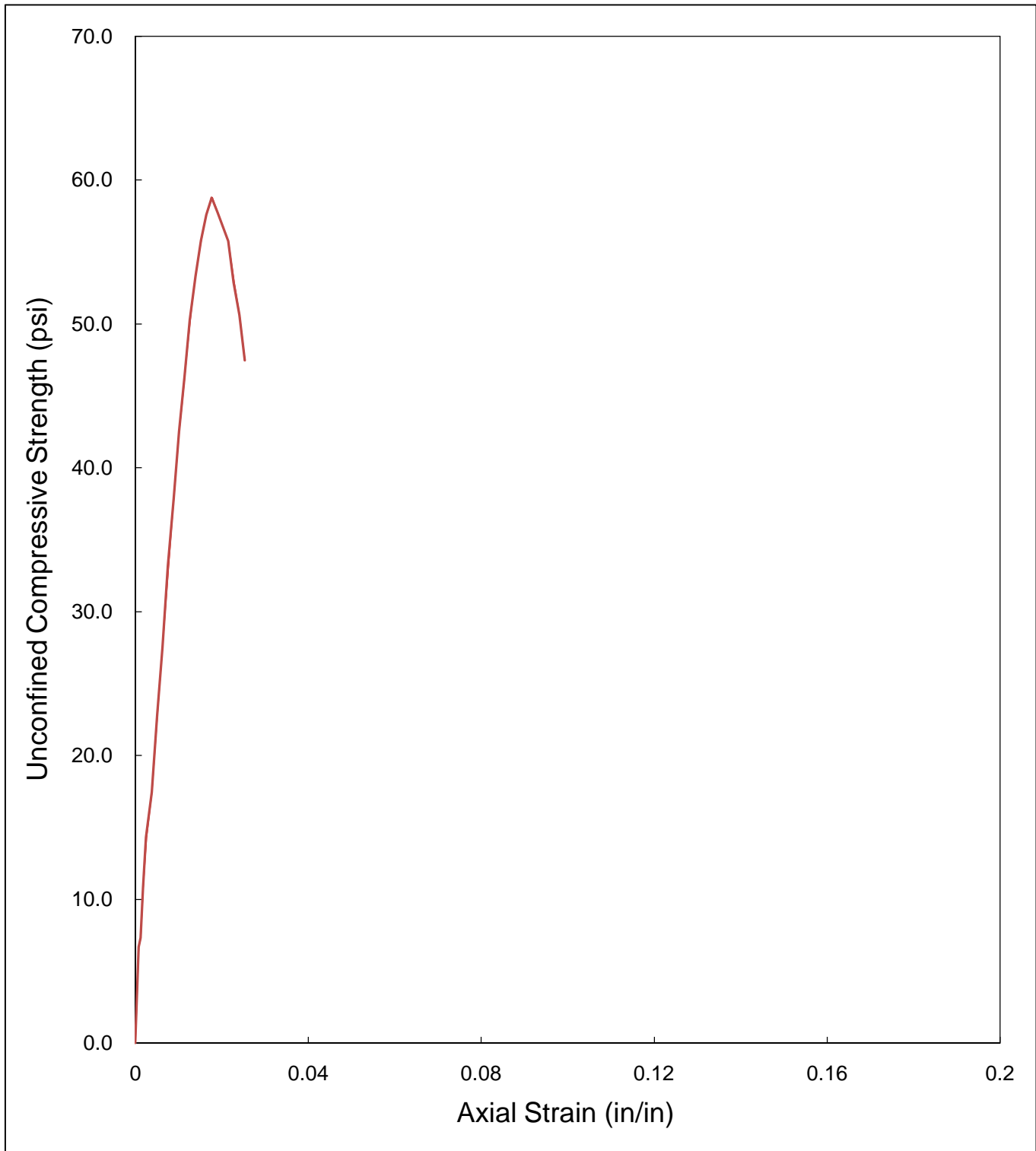
SOIL SPECIMEN DIMENSIONS		
	DIAMETER	LENGTH
No. 1	2.00 in.	3.95 in.
No. 2	2.01 in.	3.94 in.
No. 3	1.99 in.	3.96 in.
<b>Average</b>	<b>2.00 in.</b>	<b>3.95 in.</b>

SPECIMEN CONDITIONS	
<b>Initial Specimen WT, Wo</b>	<b>393.21 g</b>
Initial Area, Ao	3.14 in <sup>2</sup>
Initial Volume, Vo	12.41 in <sup>3</sup>
Initial Bulk Unit Weight,	120.7 lb/ft <sup>3</sup>
Initial Dry Unit Weight	95.2 lb/ft <sup>3</sup>
15 % Strain (0.15 Lo)	0.59 in.
UCS	58.8 lb/in <sup>2</sup>

[illegible]

# UNCONFINED COMPRESSION TESTING

Sample No. 0301-019 (14-Day)



# UNCONFINED COMPRESSION TEST

ASTM D 2166

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-019 (14-Day)  
TESTING DATE: 5/20/2009  
TESTED BY: KG

LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5849\_US

TESTING PARAMETER AND RESULTS	
MOISTURE CONTENT	26.8 %
BULK UNIT WEIGHT	120.7 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	95.2 lb/ft <sup>3</sup>
UCS *	58.8 lb/in <sup>2</sup>

\* UCS - UNCONFINED COMPRESSIVE STRENGTH

## ASTM D 2166

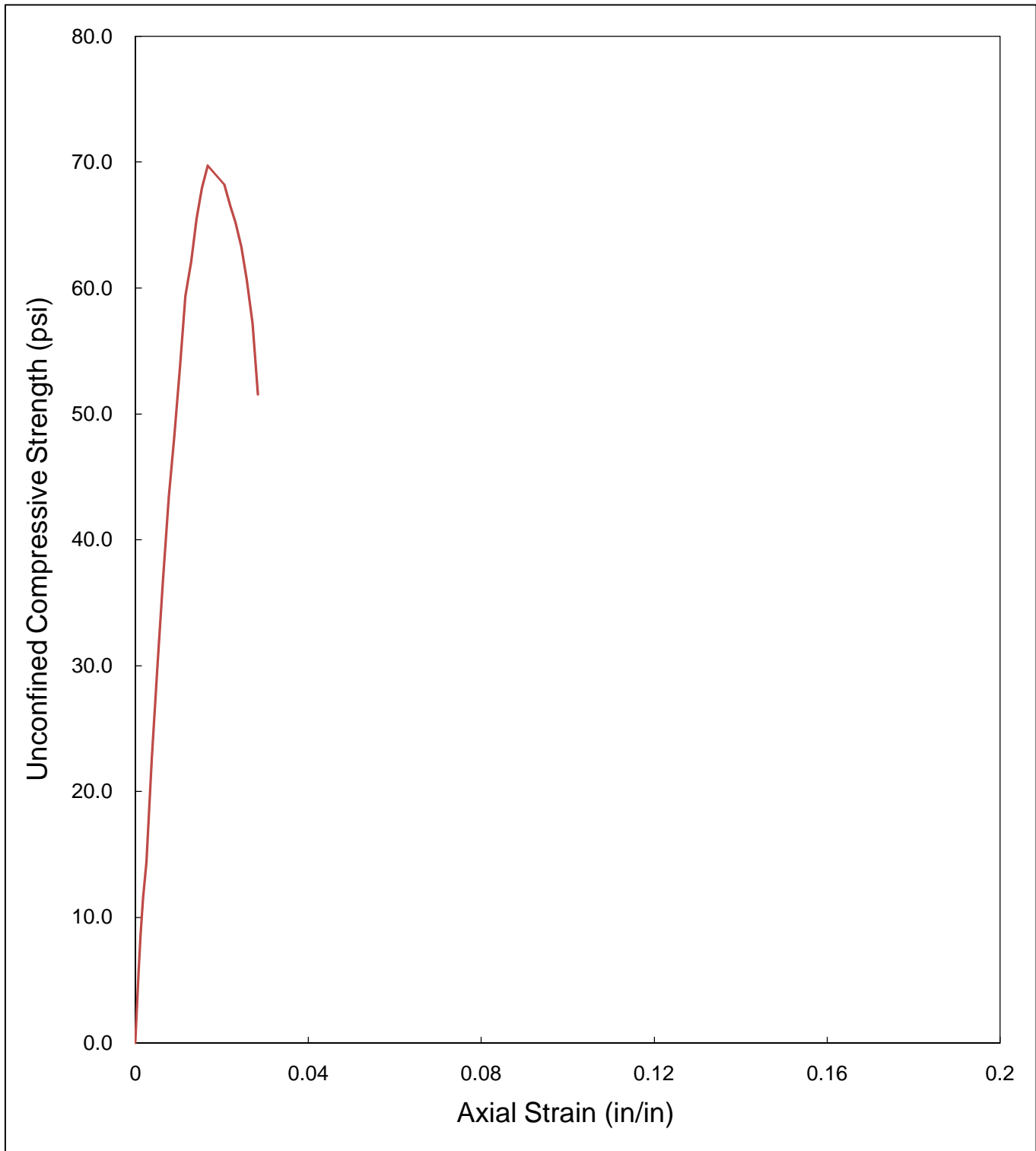
LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5909\_US

SOIL SPECIMEN DIMENSIONS		
	DIAMETER	LENGTH
No. 1	1.99 in.	3.88 in.
No. 2	2.00 in.	3.87 in.
No. 3	2.00 in.	3.90 in.
Average	2.00 in.	3.88 in.

[illegible]

# UNCONFINED COMPRESSION TESTING

Sample No. 0301-019 (28 day)



# UNCONFINED COMPRESSION TEST

ASTM D 2166

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-019 (28 day)  
TESTING DATE: 6/3/2009  
TESTED BY: KG

LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5909\_US

TESTING PARAMETER AND RESULTS	
MOISTURE CONTENT	23.4 %
BULK UNIT WEIGHT	120.0 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	97.2 lb/ft <sup>3</sup>
UCS *	69.7 lb/in <sup>2</sup>

\* UCS - UNCONFINED COMPRESSIVE STRENGTH

# UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT: Norwich MGP  
 PROJECT No.: SE-0301  
 SAMPLE No.: 0301-020 (7-Day)  
 TESTING DATE: 13-May-09  
 TESTED BY: RSL

LOADING RATE: 0.04 in./min.  
 TRACKING CODE: 5827\_US

MOISTURE CONTENT (Dry Basis)	
1. MOISTURE TIN NO.	0301-020
2. WT MOISTURE TIN (tare weight)	69.86 g
3. WT WET SOIL + TARE	156.57 g
4. WT DRY SOIL + TARE	137.44 g
5. WT WATER, Ww	19.13 g
6. WT DRY SOIL, Ws	67.58 g
7. MOISTURE CONTENT, W	28.31 %

SOIL SPECIMEN DIMENSIONS		
	DIAMETER	LENGTH
No. 1	2.00 in.	3.92 in.
No. 2	2.00 in.	3.92 in.
No. 3	1.99 in.	3.91 in.
Average	2.00 in.	3.92 in.

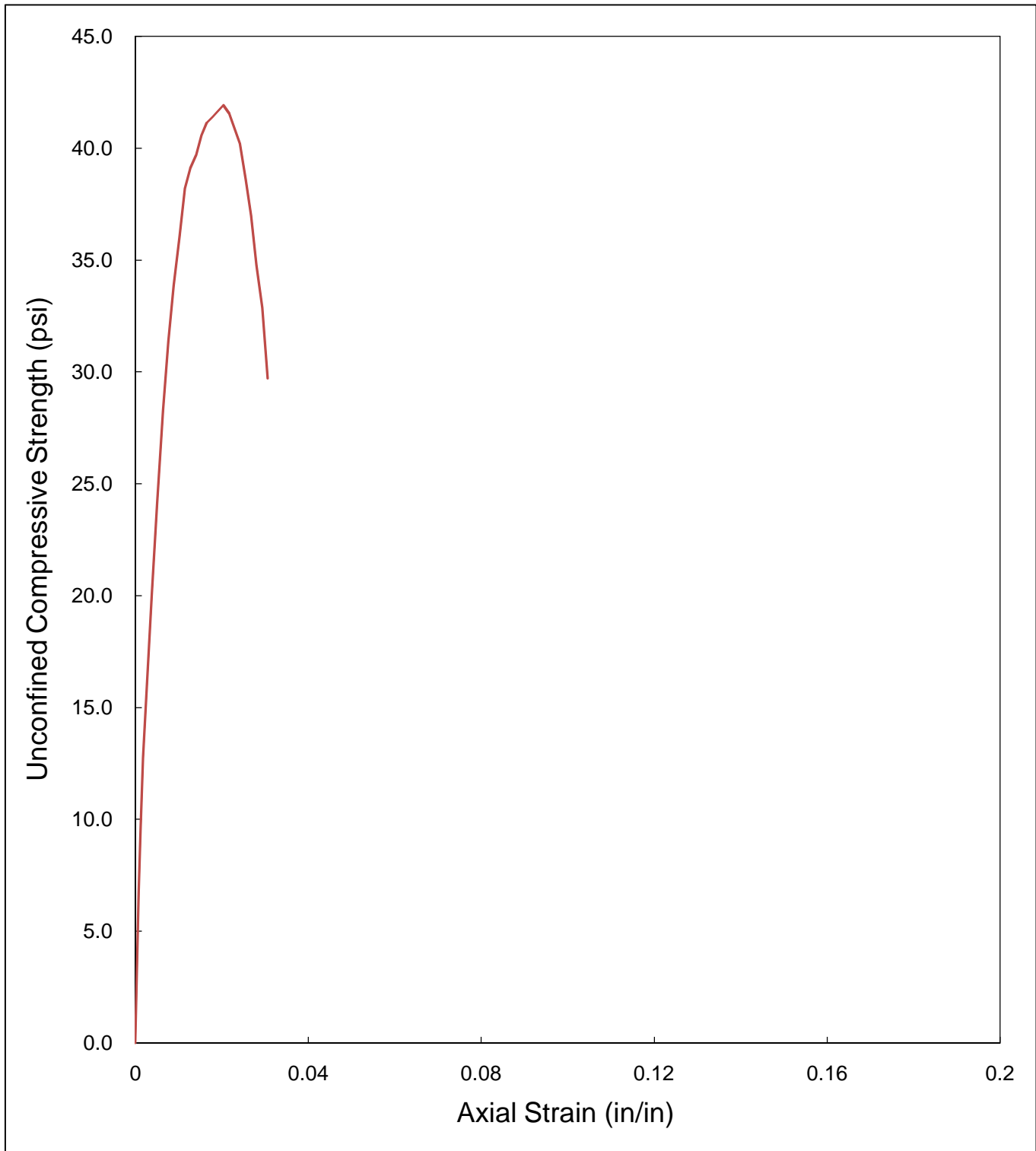
SPECIMEN CONDITIONS	
Initial Specimen WT, Wo	380.28 g
Initial Area, Ao	3.13 in <sup>2</sup>
Initial Volume, Vo	12.26 in <sup>3</sup>
Initial Bulk Unit Weight,	118.1 lb/ft <sup>3</sup>
Initial Dry Unit Weight	92.1 lb/ft <sup>3</sup>
15 % Strain (0.15 Lo)	0.59 in.
UCS	41.9 lb/in <sup>2</sup>

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in <sup>2</sup> )	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in <sup>2</sup> )
0	0.000	0.000	3.131	0.0000	0.0
21	0.003	0.003	3.134	0.0008	6.7
30	0.005	0.005	3.135	0.0013	9.6
40	0.007	0.007	3.137	0.0018	12.8
49	0.010	0.010	3.139	0.0026	15.6
63	0.015	0.015	3.143	0.0038	20.0
76	0.020	0.020	3.147	0.0051	24.1
89	0.025	0.025	3.151	0.0064	28.2
99	0.030	0.030	3.155	0.0077	31.4
107	0.035	0.035	3.159	0.0089	33.9
114	0.040	0.040	3.163	0.0102	36.0
121	0.045	0.045	3.168	0.0115	38.2
124	0.050	0.050	3.172	0.0128	39.1
126	0.055	0.055	3.176	0.0140	39.7
129	0.060	0.060	3.180	0.0153	40.6
131	0.065	0.065	3.184	0.0166	41.1
132	0.070	0.070	3.188	0.0179	41.4
133	0.075	0.075	3.192	0.0191	41.7
134	0.080	0.080	3.196	0.0204	41.9
133	0.085	0.085	3.201	0.0217	41.6
131	0.090	0.090	3.205	0.0230	40.9
129	0.095	0.095	3.209	0.0243	40.2
124	0.100	0.100	3.213	0.0255	38.6
119	0.105	0.105	3.217	0.0268	37.0
112	0.110	0.110	3.222	0.0281	34.8
106	0.115	0.115	3.226	0.0294	32.9
96	0.120	0.120	3.230	0.0306	29.7



# UNCONFINED COMPRESSION TESTING

Sample No. 0301-020 (7-Day)



# UNCONFINED COMPRESSION TEST

ASTM D 2166

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-020 (7-Day)  
TESTING DATE: 5/13/2009  
TESTED BY: RSL

LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5827\_US

TESTING PARAMETER AND RESULTS	
MOISTURE CONTENT	28.3 %
BULK UNIT WEIGHT	118.1 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	92.1 lb/ft <sup>3</sup>
UCS *	41.9 lb/in <sup>2</sup>

\* UCS - UNCONFINED COMPRESSIVE STRENGTH

## ASTM D 2166

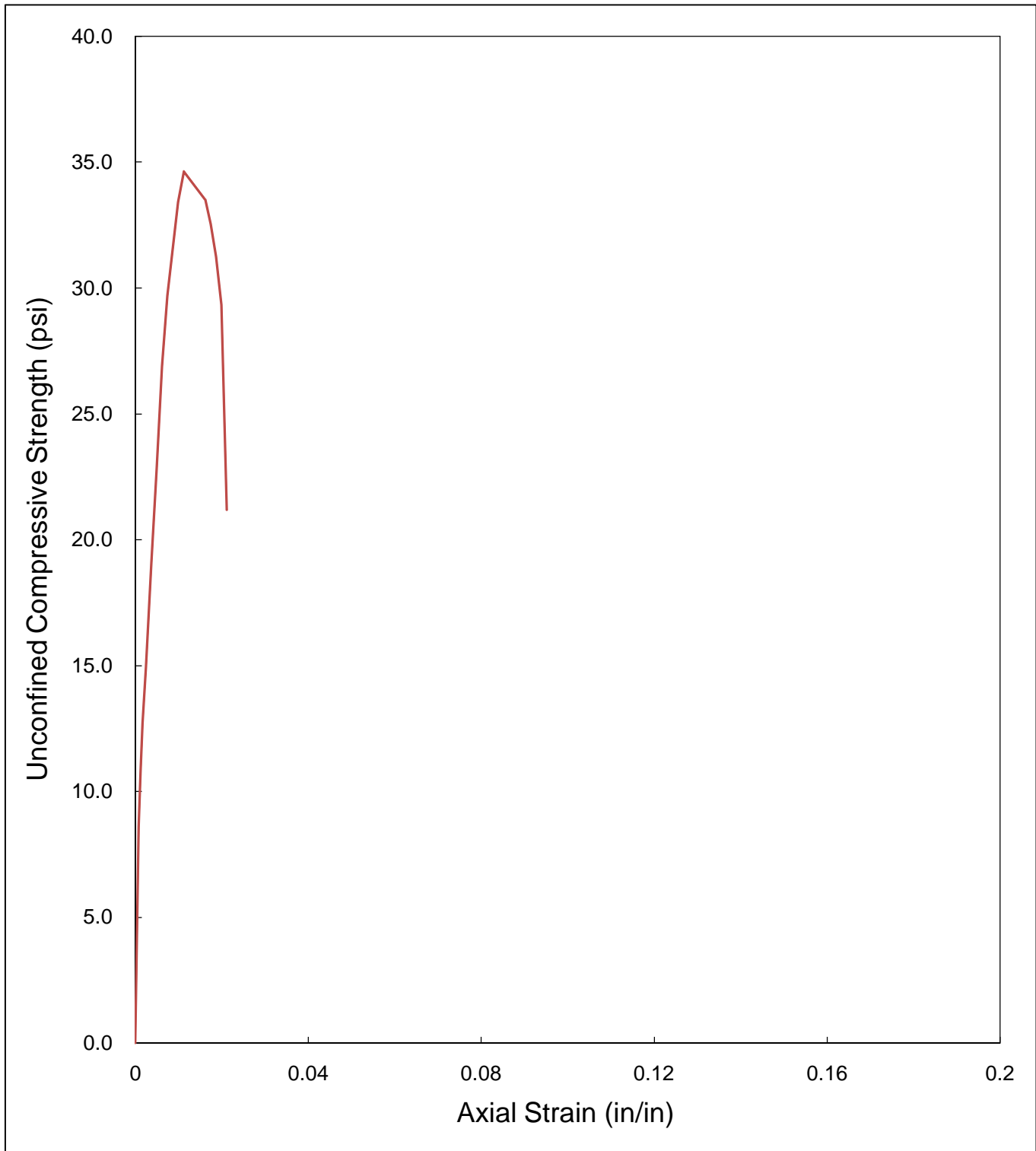
LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5850 US

SOIL SPECIMEN DIMENSIONS		
	DIAMETER	LENGTH
No. 1	2.00 in.	4.00 in.
No. 2	2.00 in.	4.01 in.
No. 3	2.00 in.	4.04 in.
<b>Average</b>	<b>2.00 in.</b>	<b>4.02 in.</b>

[illegible]

# UNCONFINED COMPRESSION TESTING

Sample No. 0301-020 (14-Day)



# UNCONFINED COMPRESSION TEST

ASTM D 2166

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-020 (14-Day)  
TESTING DATE: 5/20/2009  
TESTED BY: KG

LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5850\_US

TESTING PARAMETER AND RESULTS	
MOISTURE CONTENT	23.9 %
BULK UNIT WEIGHT	121.1 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	97.8 lb/ft <sup>3</sup>
UCS *	34.6 lb/in <sup>2</sup>

\* UCS - UNCONFINED COMPRESSIVE STRENGTH

## ASTM D 2166

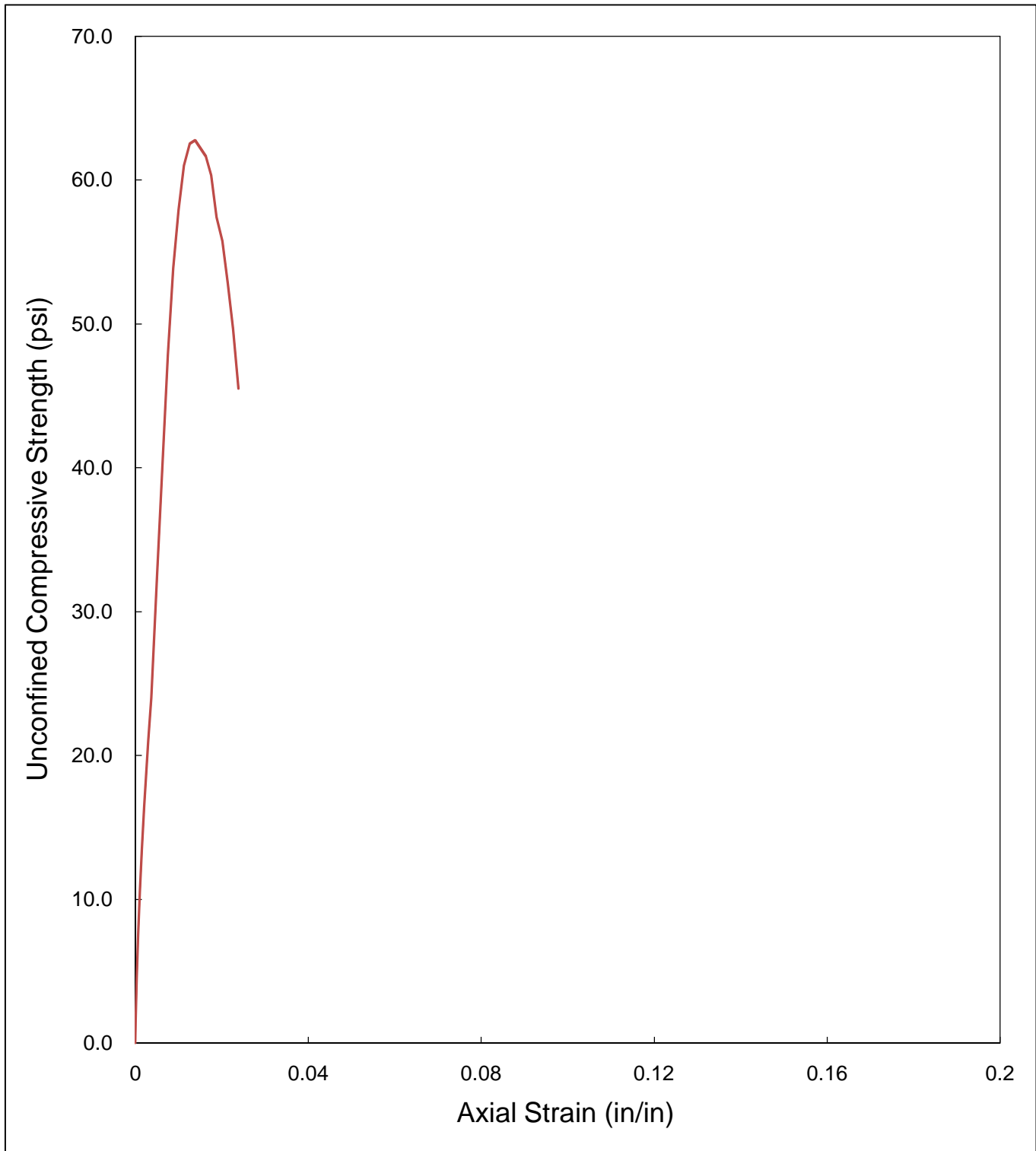
LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5910 US

SOIL SPECIMEN DIMENSIONS		
	DIAMETER	LENGTH
No. 1	2.00 in.	4.01 in.
No. 2	1.99 in.	3.98 in.
No. 3	1.98 in.	3.97 in.
Average	1.99 in.	3.99 in.

[illegible]

# UNCONFINED COMPRESSION TESTING

Sample No. 0301-020 (28 day)



# UNCONFINED COMPRESSION TEST

ASTM D 2166

## SUMMARY OF RESULTS

PROJECT: Norwich MGP  
PROJECT No.: SE-0301  
SAMPLE No.: 0301-020 (28 day)  
TESTING DATE: 6/3/2009  
TESTED BY: KG

LOADING RATE: 0.04 in./min.  
TRACKING CODE: 5910\_US

TESTING PARAMETER AND RESULTS	
MOISTURE CONTENT	24.3 %
BULK UNIT WEIGHT	117.7 lb/ft <sup>3</sup>
DRY UNIT WEIGHT	94.7 lb/ft <sup>3</sup>
UCS *	62.8 lb/in <sup>2</sup>

\* UCS - UNCONFINED COMPRESSIVE STRENGTH



## ASTM D 2166

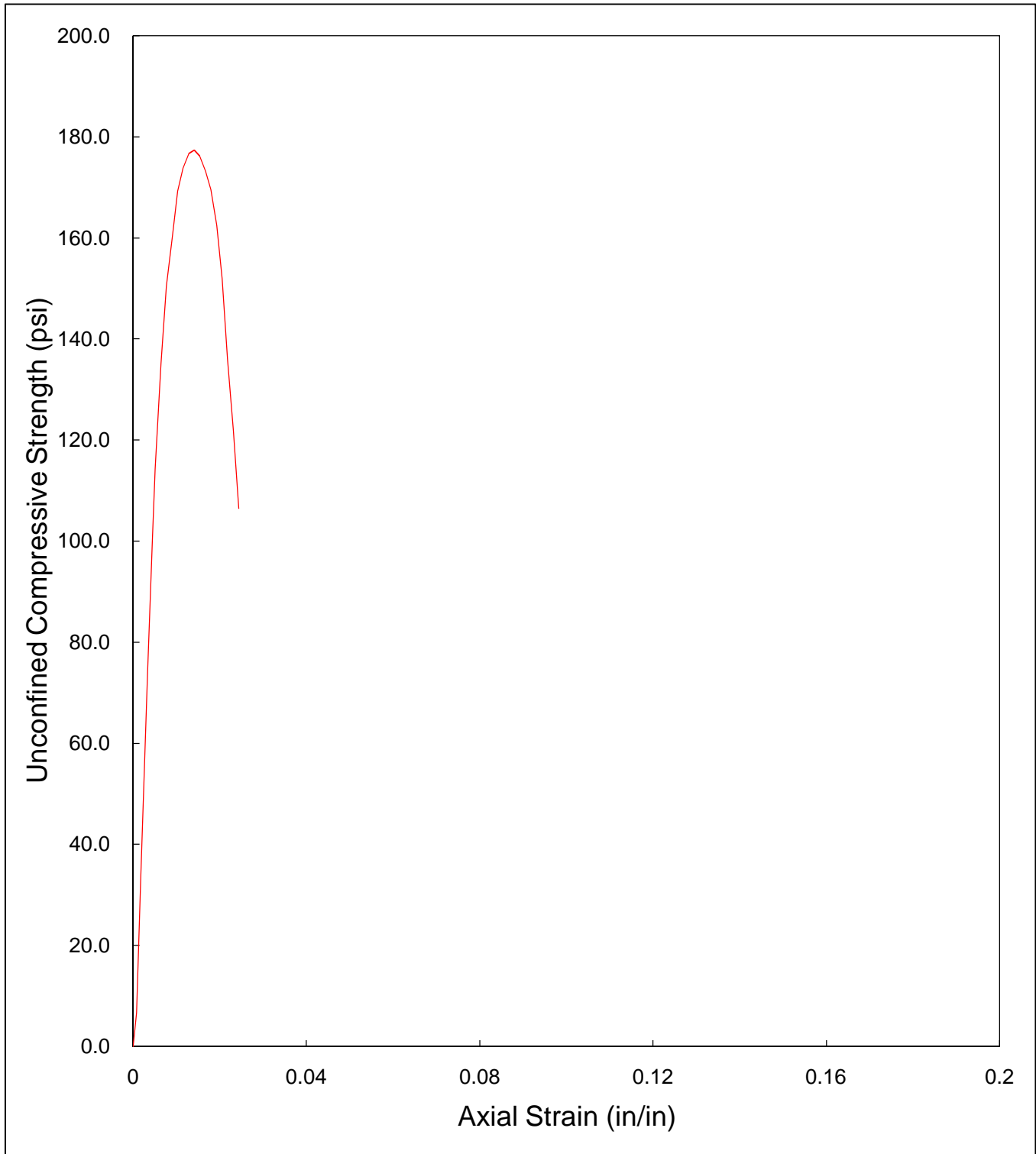
LOADING RATE: 0.04 in./min.  
TRACKING CODE: 6203\_US

SOIL SPECIMEN DIMENSIONS		
	DIAMETER	LENGTH
No. 1	2.00 in.	3.90 in.
No. 2	2.00 in.	3.90 in.
No. 3	2.01 in.	3.90 in.
<b>Average</b>	<b>2.00 in.</b>	<b>3.90 in.</b>

[illegible]

# UNCONFINED COMPRESSION TESTING

Sample No. 0301-021 (28 Day)



# UNCONFINED COMPRESSION TEST

ASTM D 2166  
SUMMARY OF RESULTS

PROJECT:	Norwich MPG		
PROJECT No.:	SE-0301		
SAMPLE No.:	0301-021 (28 Day)		
TESTING DATE:	8/24/2009	LOADING RATE:	0.04 in./min.
TESTED BY:	SEM	TRACKING CODE:	6203_US

TESTING PARAMETER AND RESULTS	
MOISTURE CONTENT	19.7 %
BULK UNIT WEIGHT	124.9 lb/ft³
DRY UNIT WEIGHT	104.3 lb/ft³
UCS *	177.3 lb/in²

\* UCS - UNCONFINED COMPRESSIVE STRENGTH

# UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT: Norwich MPG  
 PROJECT No.: SE-0301  
 SAMPLE No.: 0301-022 (28 Day)  
 TESTING DATE: 26-Aug-09  
 TESTED BY: KG

LOADING RATE: 0.04 in./min.  
 TRACKING CODE: 6202\_US

MOISTURE CONTENT (Dry Basis)	
1. MOISTURE TIN NO.	<u>0301-022</u>
2. WT MOISTURE TIN (tare weight)	<u>71.94</u> g
3. WT WET SOIL + TARE	<u>101.21</u> g
4. WT DRY SOIL + TARE	<u>94.47</u> g
5. WT WATER, Ww	<u>6.74</u> g
6. WT DRY SOIL, Ws	<u>22.53</u> g
7. MOISTURE CONTENT, W	<u>29.92</u> %

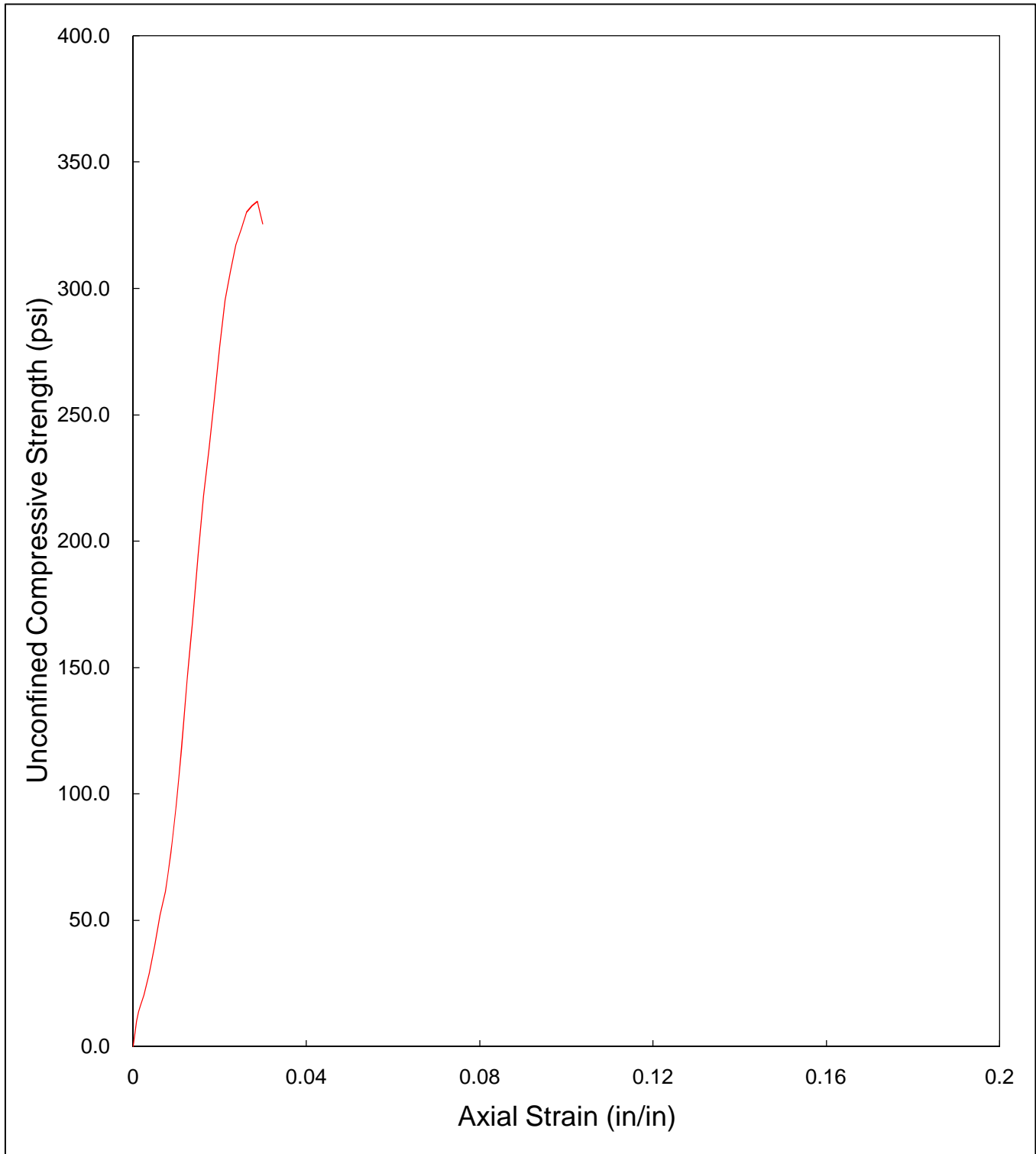
SOIL SPECIMEN DIMENSIONS		
	DIAMETER	LENGTH
No. 1	<u>2.01</u> in.	<u>4.01</u> in.
No. 2	<u>2.02</u> in.	<u>4.01</u> in.
No. 3	<u>2.02</u> in.	<u>4.02</u> in.
Average	<u>2.02</u> in.	<u>4.02</u> in.

SPECIMEN CONDITIONS	
Initial Specimen WT, Wo	<u>387.07</u> g
Initial Area, Ao	<u>3.19</u> in <sup>2</sup>
Initial Volume, Vo	<u>12.82</u> in <sup>3</sup>
Initial Bulk Unit Weight,	<u>115.0</u> lb/ft <sup>3</sup>
Initial Dry Unit Weight	<u>88.5</u> lb/ft <sup>3</sup>
15 % Strain (0.15 Lo)	<u>0.60</u> in.
UCS	<u>334.3</u> lb/in <sup>2</sup>

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in <sup>2</sup> )	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in <sup>2</sup> )
<u>0</u>	<u>0.000</u>	<u>0.000</u>	<u>3.193</u>	<u>0.0000</u>	<u>0.0</u>
<u>32</u>	<u>0.003</u>	<u>0.003</u>	<u>3.196</u>	<u>0.0007</u>	<u>10.0</u>
<u>44</u>	<u>0.005</u>	<u>0.005</u>	<u>3.197</u>	<u>0.0012</u>	<u>13.8</u>
<u>52</u>	<u>0.007</u>	<u>0.007</u>	<u>3.199</u>	<u>0.0017</u>	<u>16.3</u>
<u>65</u>	<u>0.010</u>	<u>0.010</u>	<u>3.201</u>	<u>0.0025</u>	<u>20.3</u>
<u>93</u>	<u>0.015</u>	<u>0.015</u>	<u>3.205</u>	<u>0.0037</u>	<u>29.0</u>
<u>128</u>	<u>0.020</u>	<u>0.020</u>	<u>3.209</u>	<u>0.0050</u>	<u>39.9</u>
<u>167</u>	<u>0.025</u>	<u>0.025</u>	<u>3.213</u>	<u>0.0062</u>	<u>52.0</u>
<u>197</u>	<u>0.030</u>	<u>0.030</u>	<u>3.217</u>	<u>0.0075</u>	<u>61.2</u>
<u>246</u>	<u>0.035</u>	<u>0.035</u>	<u>3.221</u>	<u>0.0087</u>	<u>76.4</u>
<u>308</u>	<u>0.040</u>	<u>0.040</u>	<u>3.225</u>	<u>0.0100</u>	<u>95.5</u>
<u>380</u>	<u>0.045</u>	<u>0.045</u>	<u>3.229</u>	<u>0.0112</u>	<u>117.7</u>
<u>467</u>	<u>0.050</u>	<u>0.050</u>	<u>3.233</u>	<u>0.0125</u>	<u>144.4</u>
<u>541</u>	<u>0.055</u>	<u>0.055</u>	<u>3.237</u>	<u>0.0137</u>	<u>167.1</u>
<u>631</u>	<u>0.060</u>	<u>0.060</u>	<u>3.242</u>	<u>0.0149</u>	<u>194.7</u>
<u>707</u>	<u>0.065</u>	<u>0.065</u>	<u>3.246</u>	<u>0.0162</u>	<u>217.8</u>
<u>767</u>	<u>0.070</u>	<u>0.070</u>	<u>3.250</u>	<u>0.0174</u>	<u>236.0</u>
<u>833</u>	<u>0.075</u>	<u>0.075</u>	<u>3.254</u>	<u>0.0187</u>	<u>256.0</u>
<u>902</u>	<u>0.080</u>	<u>0.080</u>	<u>3.258</u>	<u>0.0199</u>	<u>276.9</u>
<u>963</u>	<u>0.085</u>	<u>0.085</u>	<u>3.262</u>	<u>0.0212</u>	<u>295.2</u>
<u>1002</u>	<u>0.090</u>	<u>0.090</u>	<u>3.266</u>	<u>0.0224</u>	<u>306.8</u>
<u>1037</u>	<u>0.095</u>	<u>0.095</u>	<u>3.270</u>	<u>0.0237</u>	<u>317.1</u>
<u>1059</u>	<u>0.100</u>	<u>0.100</u>	<u>3.275</u>	<u>0.0249</u>	<u>323.4</u>
<u>1082</u>	<u>0.105</u>	<u>0.105</u>	<u>3.279</u>	<u>0.0261</u>	<u>330.0</u>
<u>1092</u>	<u>0.110</u>	<u>0.110</u>	<u>3.283</u>	<u>0.0274</u>	<u>332.6</u>
<u>1099</u>	<u>0.115</u>	<u>0.115</u>	<u>3.287</u>	<u>0.0286</u>	<u>334.3</u>
<u>1071</u>	<u>0.120</u>	<u>0.120</u>	<u>3.291</u>	<u>0.0299</u>	<u>325.4</u>

# UNCONFINED COMPRESSION TESTING

Sample No. 0301-022 (28 Day)



# UNCONFINED COMPRESSION TEST

ASTM D 2166  
SUMMARY OF RESULTS

PROJECT:	Norwich MPG		
PROJECT No.:	SE-0301		
SAMPLE No.:	0301-022 (28 Day)		
TESTING DATE:	8/26/2009	LOADING RATE:	0.04 in./min.
TESTED BY:	KG	TRACKING CODE:	6202_US

TESTING PARAMETER AND RESULTS	
MOISTURE CONTENT	29.9 %
BULK UNIT WEIGHT	115.0 lb/ft³
DRY UNIT WEIGHT	88.5 lb/ft³
UCS *	334.3 lb/in²

\* UCS - UNCONFINED COMPRESSIVE STRENGTH

## ASTM D 2166

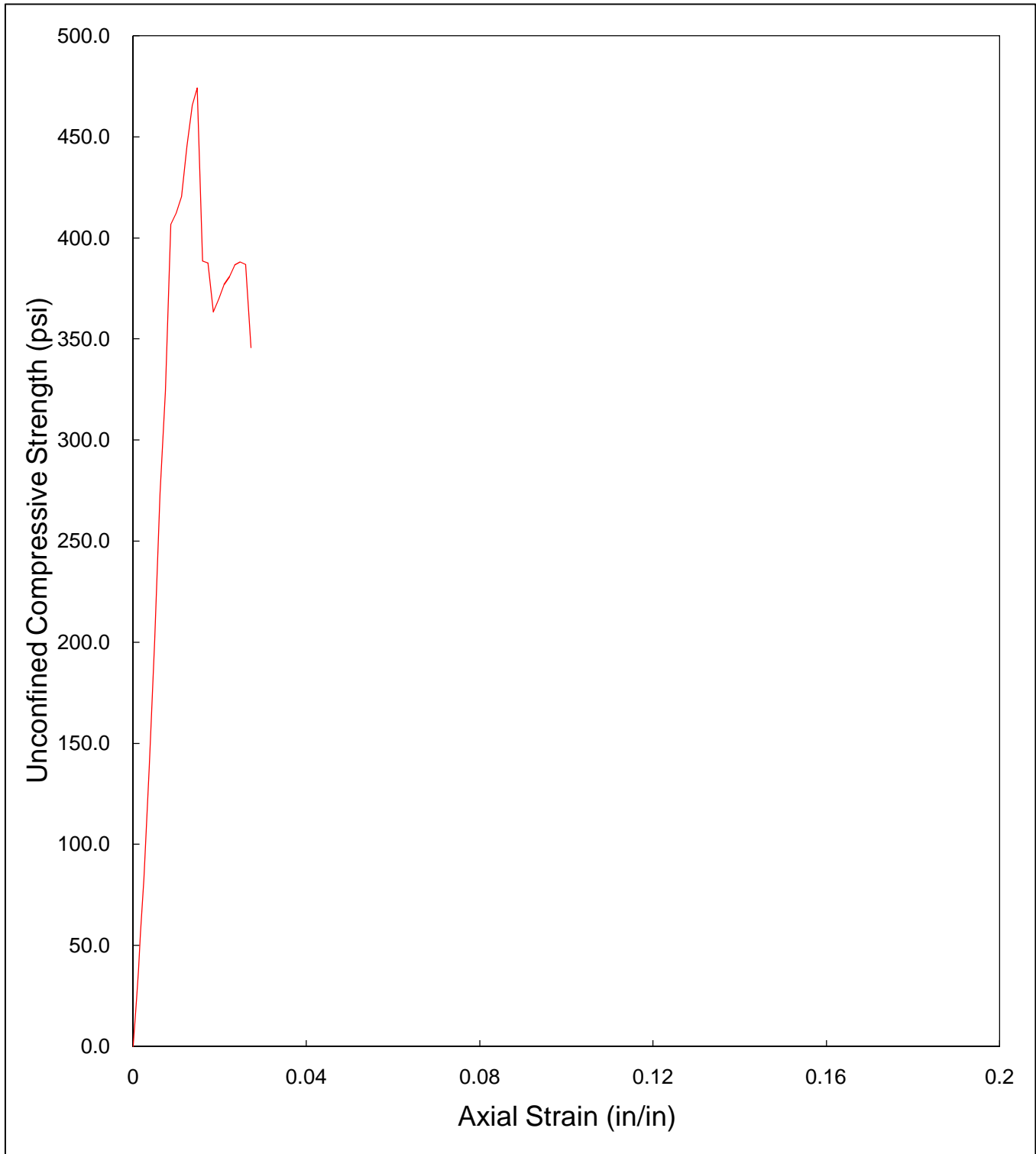
LOADING RATE: 0.04 in./min.  
TRACKING CODE: 6201\_US

<b>SOIL SPECIMEN DIMENSIONS</b>		
	<b>DIAMETER</b>	<b>LENGTH</b>
No. 1	2.01 in.	4.05 in.
No. 2	2.00 in.	4.04 in.
No. 3	2.00 in.	4.05 in.
<b>Average</b>	<b>2.00 in.</b>	<b>4.05 in.</b>

[illegible]

# UNCONFINED COMPRESSION TESTING

Sample No. 0301-023 (28 Day )





# UNCONFINED COMPRESSION TEST

ASTM D 2166  
SUMMARY OF RESULTS

PROJECT:	Norwich MPG		
PROJECT No.:	SE-0301		
SAMPLE No.:	0301-023 (28 Day )		
TESTING DATE:	8/26/2009	LOADING RATE:	0.04 in./min.
TESTED BY:	KG	TRACKING CODE:	6201_US

TESTING PARAMETER AND RESULTS	
MOISTURE CONTENT	25.4 %
BULK UNIT WEIGHT	118.3 lb/ft³
DRY UNIT WEIGHT	94.3 lb/ft³
UCS *	474.1 lb/in²

\* UCS - UNCONFINED COMPRESSIVE STRENGTH

## ASTM D 2166

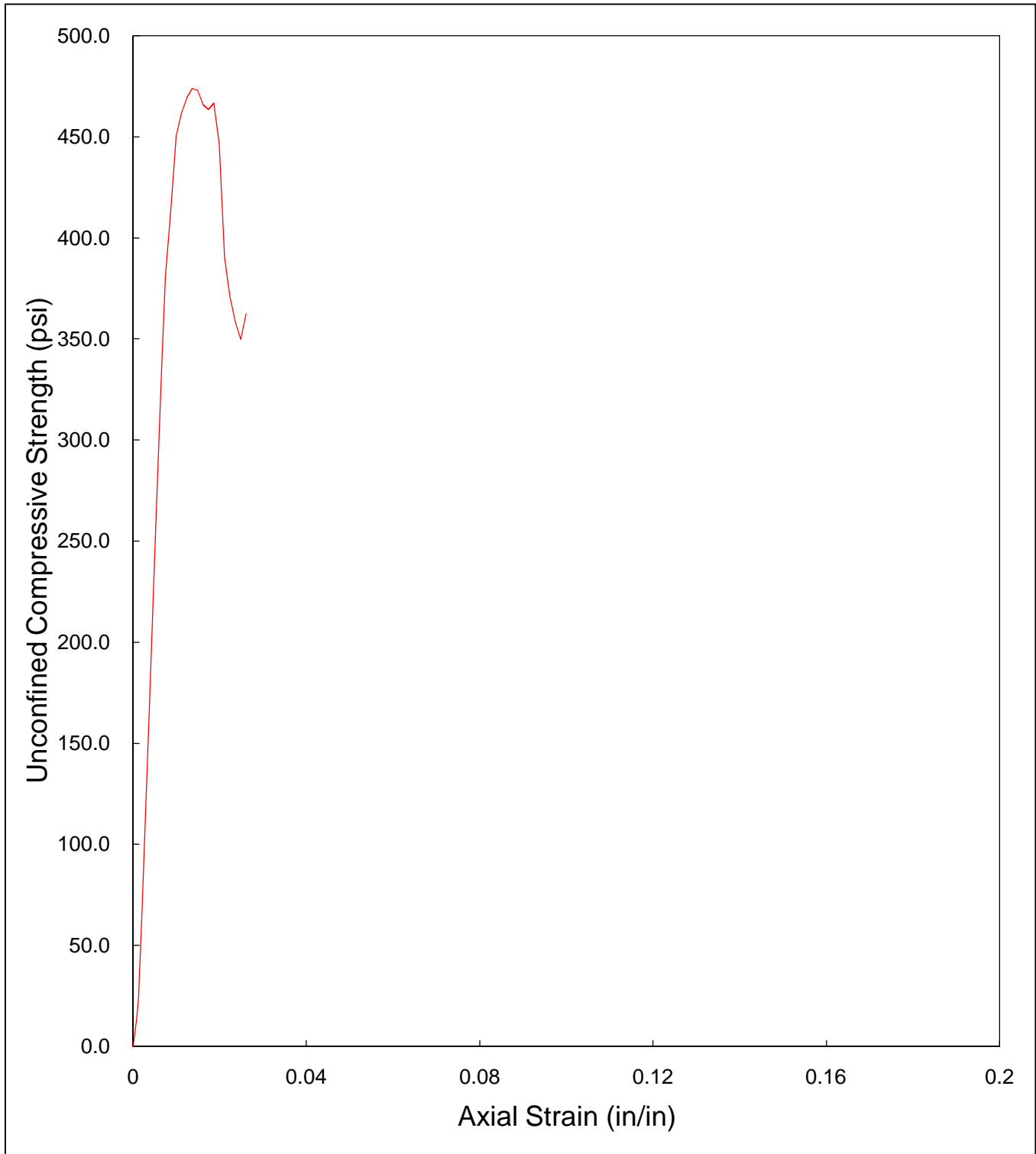
LOADING RATE: 0.04 in./min.  
TRACKING CODE: 6200\_US

SOIL SPECIMEN DIMENSIONS		
	DIAMETER	LENGTH
No. 1	2.01 in.	4.05 in.
No. 2	2.02 in.	4.03 in.
No. 3	2.01 in.	4.03 in.
Average	2.01 in.	4.04 in.

[illegible]

# UNCONFINED COMPRESSION TESTING

Sample No. 0301-024 (28 Day)



# UNCONFINED COMPRESSION TEST

ASTM D 2166  
SUMMARY OF RESULTS

PROJECT:	Norwich MPG		
PROJECT No.:	SE-0301		
SAMPLE No.:	0301-024 (28 Day)		
TESTING DATE:	8/26/2009	LOADING RATE:	0.04 in./min.
TESTED BY:	KG	TRACKING CODE:	6200_US

TESTING PARAMETER AND RESULTS	
MOISTURE CONTENT	27.2 %
BULK UNIT WEIGHT	116.4 lb/ft³
DRY UNIT WEIGHT	91.5 lb/ft³
UCS *	473.7 lb/in²

\* UCS - UNCONFINED COMPRESSIVE STRENGTH

# UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT: Norwich MPG  
 PROJECT No.: SE-0301  
 SAMPLE No.: 0301-025(28 Day)  
 TESTING DATE: 26-Aug-09  
 TESTED BY: KG

LOADING RATE: 0.04 in./min.  
 TRACKING CODE: 6199\_US

MOISTURE CONTENT (Dry Basis)	
1. MOISTURE TIN NO.	0301-025
2. WT MOISTURE TIN (tare weight)	67.12 g
3. WT WET SOIL + TARE	111.55 g
4. WT DRY SOIL + TARE	101.63 g
5. WT WATER, Ww	9.92 g
6. WT DRY SOIL, Ws	34.51 g
7. MOISTURE CONTENT, W	28.75 %

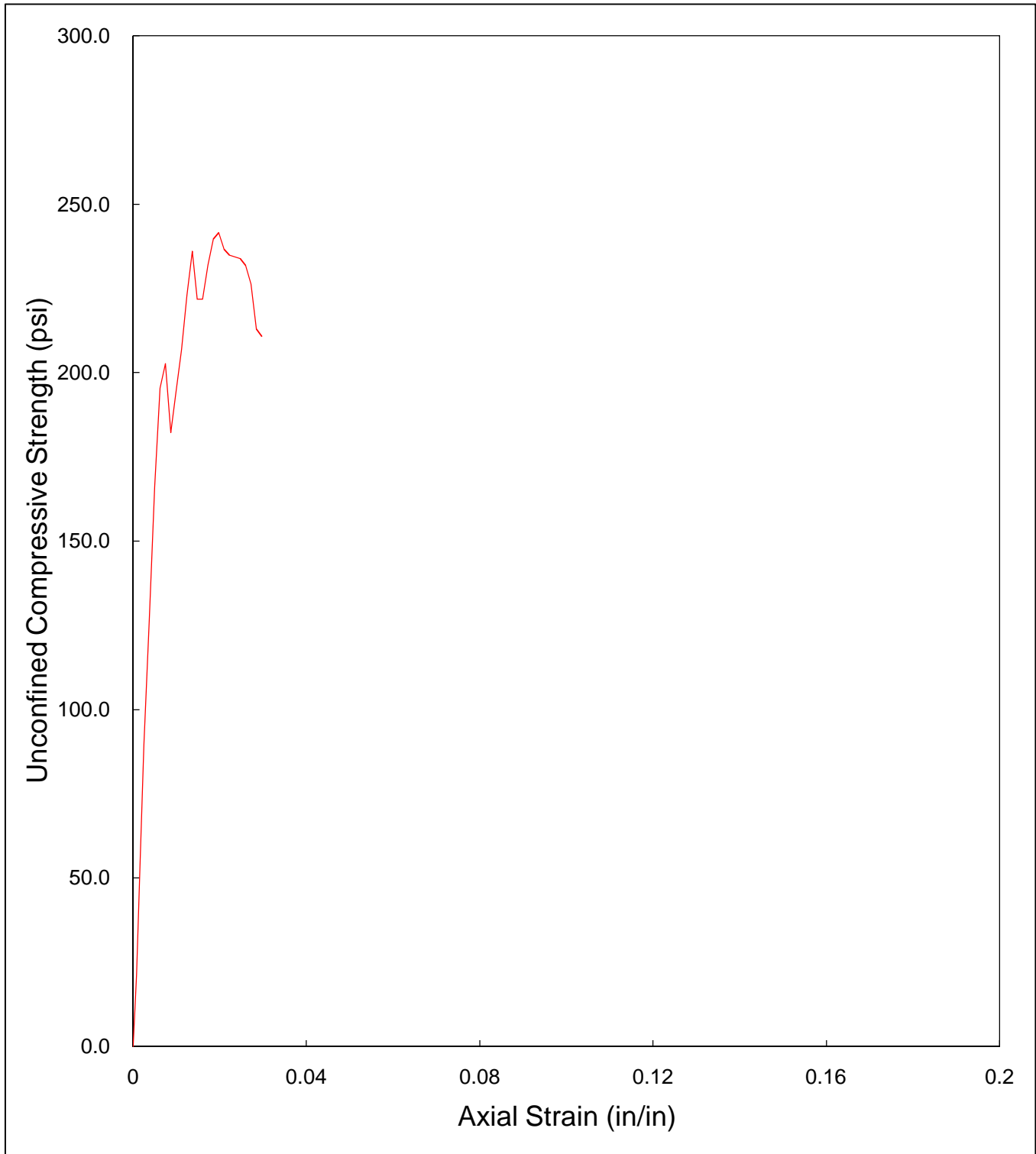
SOIL SPECIMEN DIMENSIONS		
	DIAMETER	LENGTH
No. 1	2.02 in.	4.04 in.
No. 2	2.01 in.	4.04 in.
No. 3	2.02 in.	4.05 in.
Average	2.02 in.	4.04 in.

SPECIMEN CONDITIONS	
Initial Specimen WT, Wo	389.05 g
Initial Area, Ao	3.19 in <sup>2</sup>
Initial Volume, Vo	12.92 in <sup>3</sup>
Initial Bulk Unit Weight,	114.8 lb/ft <sup>3</sup>
Initial Dry Unit Weight	89.1 lb/ft <sup>3</sup>
15 % Strain (0.15 Lo)	0.61 in.
UCS	241.5 lb/in <sup>2</sup>

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in <sup>2</sup> )	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in <sup>2</sup> )
0	0.000	0.000	3.194	0.0000	0.0
68	0.003	0.003	3.197	0.0007	21.3
127	0.005	0.005	3.198	0.0012	39.7
186	0.007	0.007	3.200	0.0017	58.1
287	0.010	0.010	3.202	0.0025	89.6
406	0.015	0.015	3.206	0.0037	126.6
533	0.020	0.020	3.210	0.0049	166.0
628	0.025	0.025	3.214	0.0062	195.4
652	0.030	0.030	3.218	0.0074	202.6
587	0.035	0.035	3.222	0.0087	182.2
628	0.040	0.040	3.226	0.0099	194.7
668	0.045	0.045	3.230	0.0111	206.8
721	0.050	0.050	3.234	0.0124	222.9
764	0.055	0.055	3.238	0.0136	235.9
719	0.060	0.060	3.242	0.0148	221.8
720	0.065	0.065	3.246	0.0161	221.8
754	0.070	0.070	3.250	0.0173	232.0
780	0.075	0.075	3.255	0.0185	239.7
787	0.080	0.080	3.259	0.0198	241.5
772	0.085	0.085	3.263	0.0210	236.6
767	0.090	0.090	3.267	0.0223	234.8
766	0.100	0.100	3.275	0.0247	233.9
760	0.105	0.105	3.279	0.0260	231.8
743	0.110	0.110	3.283	0.0272	226.3
700	0.115	0.115	3.288	0.0284	212.9
694	0.120	0.120	3.292	0.0297	210.8

# UNCONFINED COMPRESSION TESTING

Sample No. 0301-025(28 Day)



# UNCONFINED COMPRESSION TEST

ASTM D 2166  
SUMMARY OF RESULTS

PROJECT:	Norwich MPG		
PROJECT No.:	SE-0301		
SAMPLE No.:	0301-025(28 Day)		
TESTING DATE:	8/26/2009	LOADING RATE:	0.04 in./min.
TESTED BY:	KG	TRACKING CODE:	6199_US

TESTING PARAMETER AND RESULTS	
MOISTURE CONTENT	28.7 %
BULK UNIT WEIGHT	114.8 lb/ft³
DRY UNIT WEIGHT	89.1 lb/ft³
UCS *	241.5 lb/in²

\* UCS - UNCONFINED COMPRESSIVE STRENGTH

## ASTM D 2166

LOADING RATE: 0.04 in./min.  
TRACKING CODE: 6198\_US

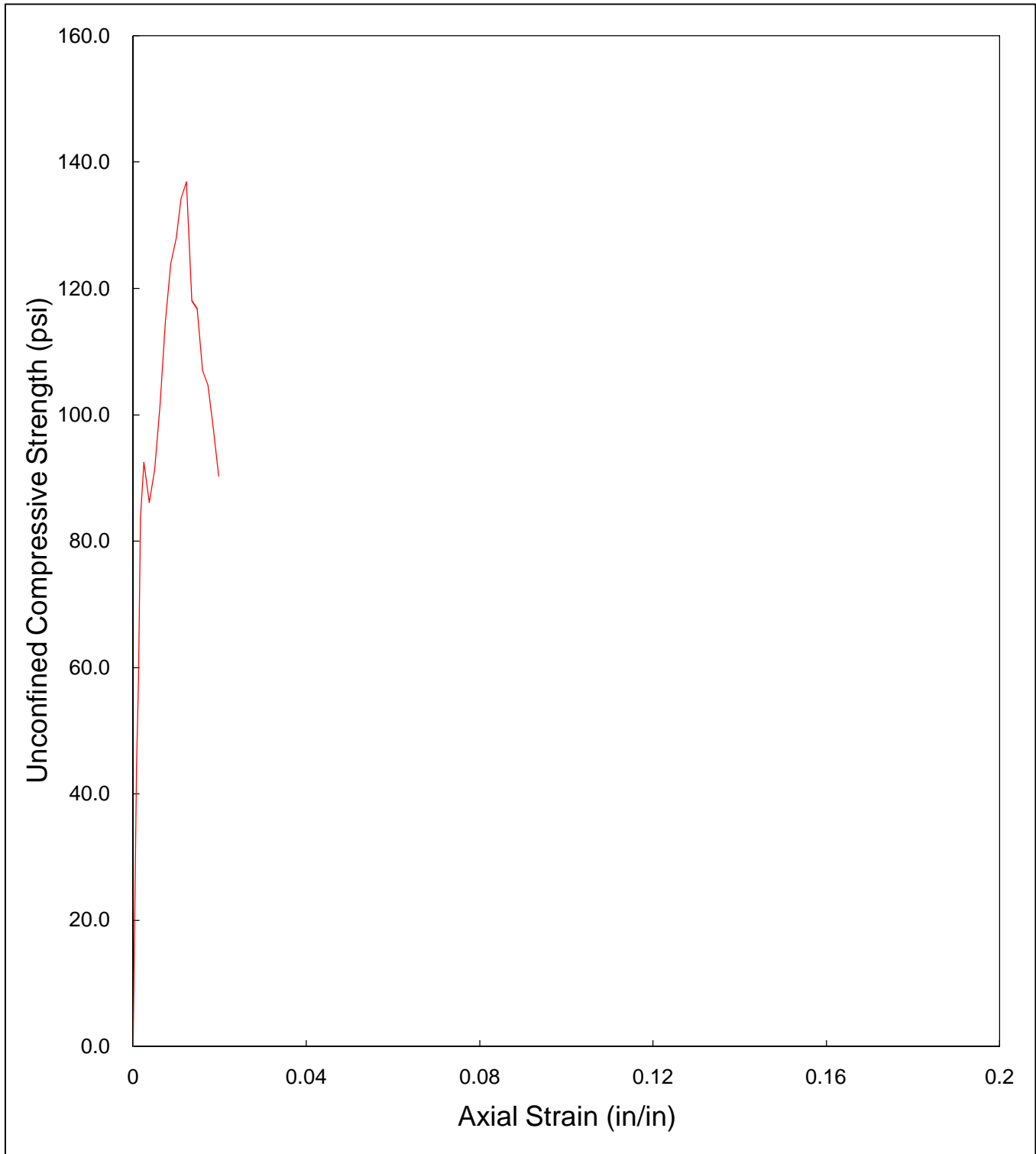
SOIL SPECIMEN DIMENSIONS		
	DIAMETER	LENGTH
No. 1	2.01 in.	4.06 in.
No. 2	2.01 in.	4.06 in.
No. 3	2.02 in.	4.06 in.
<b>Average</b>	<b>2.01 in.</b>	<b>4.06 in.</b>

[illegible]



# UNCONFINED COMPRESSION TESTING

Sample No. 0301-026 (28 Day)



# UNCONFINED COMPRESSION TEST

ASTM D 2166  
SUMMARY OF RESULTS

PROJECT:	Norwich MPG		
PROJECT No.:	SE-0301		
SAMPLE No.:	0301-026 (28 Day)		
TESTING DATE:	8/26/2009	LOADING RATE:	0.04 in./min.
TESTED BY:	KG	TRACKING CODE:	6198_US

TESTING PARAMETER AND RESULTS	
MOISTURE CONTENT	38.7 %
BULK UNIT WEIGHT	115.0 lb/ft³
DRY UNIT WEIGHT	82.9 lb/ft³
UCS *	136.8 lb/in²

\* UCS - UNCONFINED COMPRESSIVE STRENGTH

## ASTM D 2166

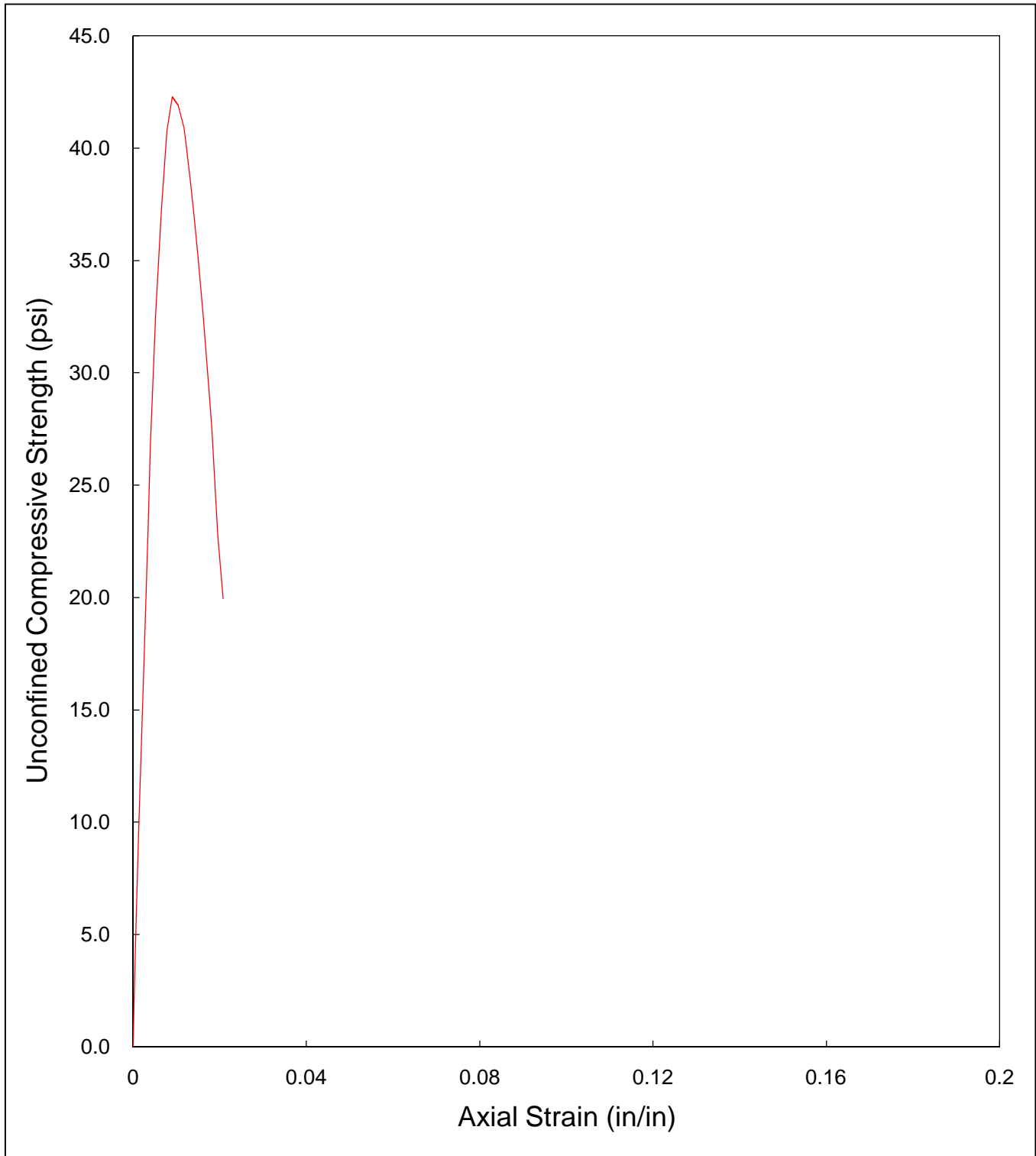
LOADING RATE: 0.04 in./min.  
TRACKING CODE: 6197\_US

SOIL SPECIMEN DIMENSIONS		
	DIAMETER	LENGTH
No. 1	2.01 in.	3.86 in.
No. 2	2.00 in.	3.85 in.
No. 3	1.99 in.	3.85 in.
<b>Average</b>	<b>2.00 in.</b>	<b>3.85 in.</b>

[illegible]

# UNCONFINED COMPRESSION TESTING

Sample No. 0301-027 (28 Day)



# UNCONFINED COMPRESSION TEST

ASTM D 2166  
SUMMARY OF RESULTS

PROJECT:	Norwich MPG		
PROJECT No.:	SE-0301		
SAMPLE No.:	0301-027 (28 Day)		
TESTING DATE:	8/26/2009	LOADING RATE:	0.04 in./min.
TESTED BY:	KG	TRACKING CODE:	6197_US

TESTING PARAMETER AND RESULTS	
MOISTURE CONTENT	23.2 %
BULK UNIT WEIGHT	124.0 lb/ft³
DRY UNIT WEIGHT	100.7 lb/ft³
UCS *	42.3 lb/in²

\* UCS - UNCONFINED COMPRESSIVE STRENGTH

## ASTM D 2166

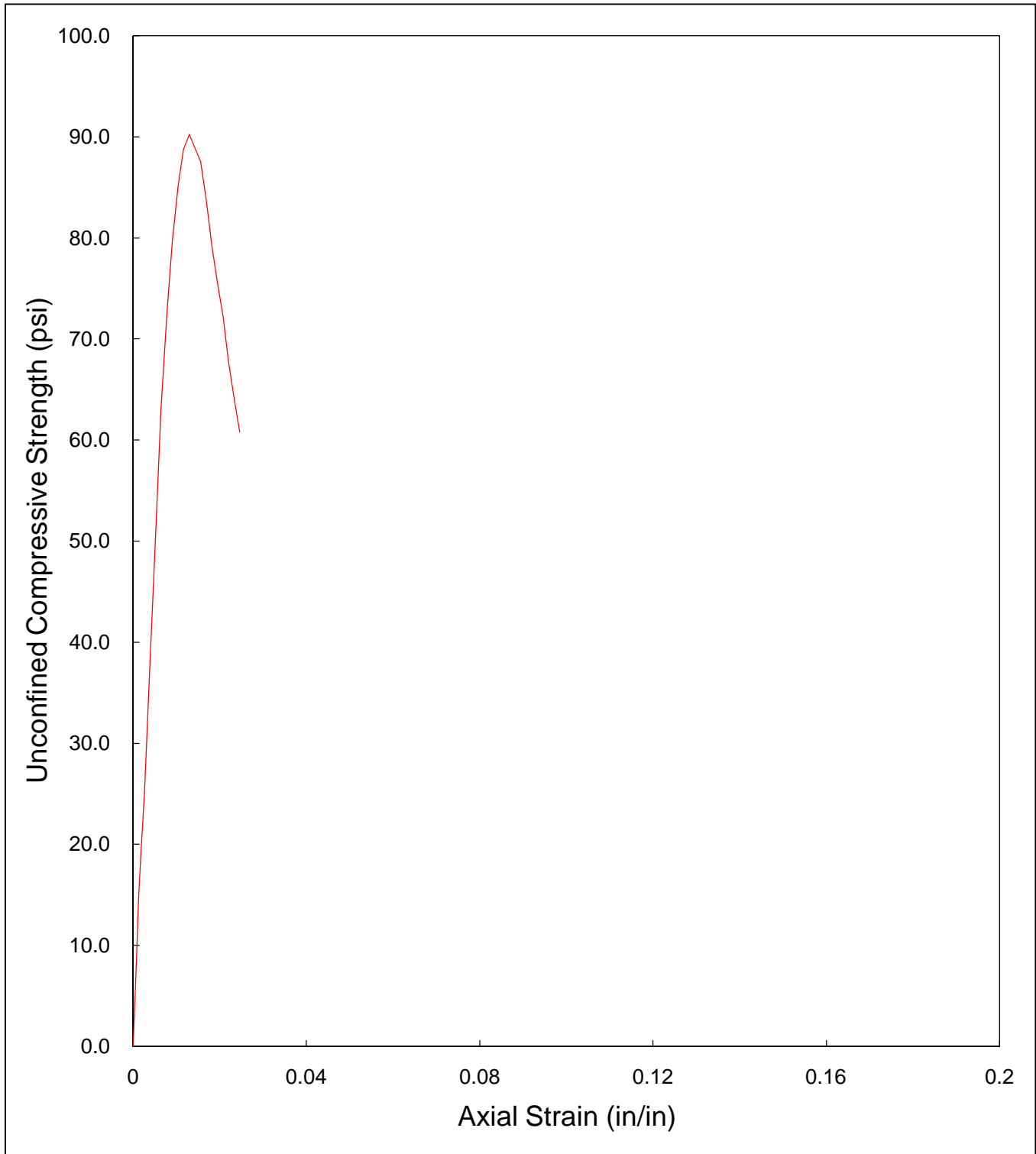
LOADING RATE: 0.04 in./min.  
TRACKING CODE: 6204\_US

<b>SOIL SPECIMEN DIMENSIONS</b>		
	<b>DIAMETER</b>	<b>LENGTH</b>
No. 1	2.00 in.	3.87 in.
No. 2	2.01 in.	3.87 in.
No. 3	2.01 in.	3.87 in.
<b>Average</b>	<b>2.01 in.</b>	<b>3.87 in.</b>

[illegible]

# UNCONFINED COMPRESSION TESTING

Sample No. 0301-028(28 Day)



# UNCONFINED COMPRESSION TEST

ASTM D 2166  
SUMMARY OF RESULTS

PROJECT:	Norwich MPG		
PROJECT No.:	SE-0301		
SAMPLE No.:	0301-028(28 Day)		
TESTING DATE:	8/26/2009	LOADING RATE:	0.04 in./min.
TESTED BY:	KG	TRACKING CODE:	6204_US

TESTING PARAMETER AND RESULTS	
MOISTURE CONTENT	24.7 %
BULK UNIT WEIGHT	123.7 lb/ft³
DRY UNIT WEIGHT	99.1 lb/ft³
UCS *	90.2 lb/in²

\* UCS - UNCONFINED COMPRESSIVE STRENGTH



## ASTM D 2166

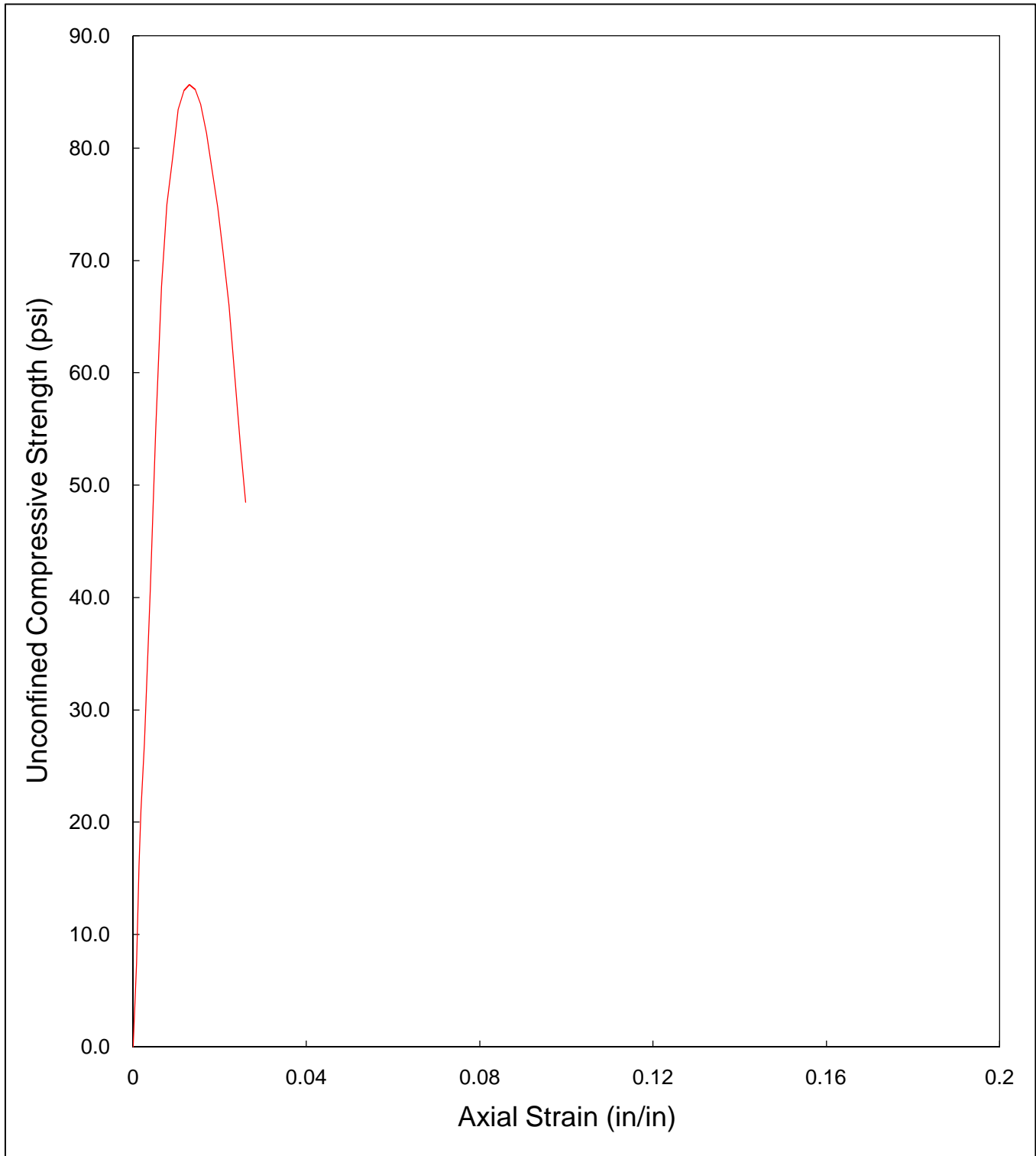
LOADING RATE: 0.04 in./min.  
TRACKING CODE: 6205\_US

SOIL SPECIMEN DIMENSIONS		
	DIAMETER	LENGTH
No. 1	2.02 in.	3.87 in.
No. 2	2.02 in.	3.86 in.
No. 3	2.03 in.	3.85 in.
<b>Average</b>	<b>2.02 in.</b>	<b>3.86 in.</b>

[illegible]

# UNCONFINED COMPRESSION TESTING

Sample No. 0301-029(28 Day)



# UNCONFINED COMPRESSION TEST

ASTM D 2166  
SUMMARY OF RESULTS

PROJECT:	Norwich MPG		
PROJECT No.:	SE-0301		
SAMPLE No.:	0301-029(28 Day)		
TESTING DATE:	8/26/2009	LOADING RATE:	0.04 in./min.
TESTED BY:	KG	TRACKING CODE:	6205_US

TESTING PARAMETER AND RESULTS	
MOISTURE CONTENT	26.8 %
BULK UNIT WEIGHT	121.1 lb/ft³
DRY UNIT WEIGHT	95.5 lb/ft³
UCS *	85.6 lb/in²

\* UCS - UNCONFINED COMPRESSIVE STRENGTH

## ASTM D 2166

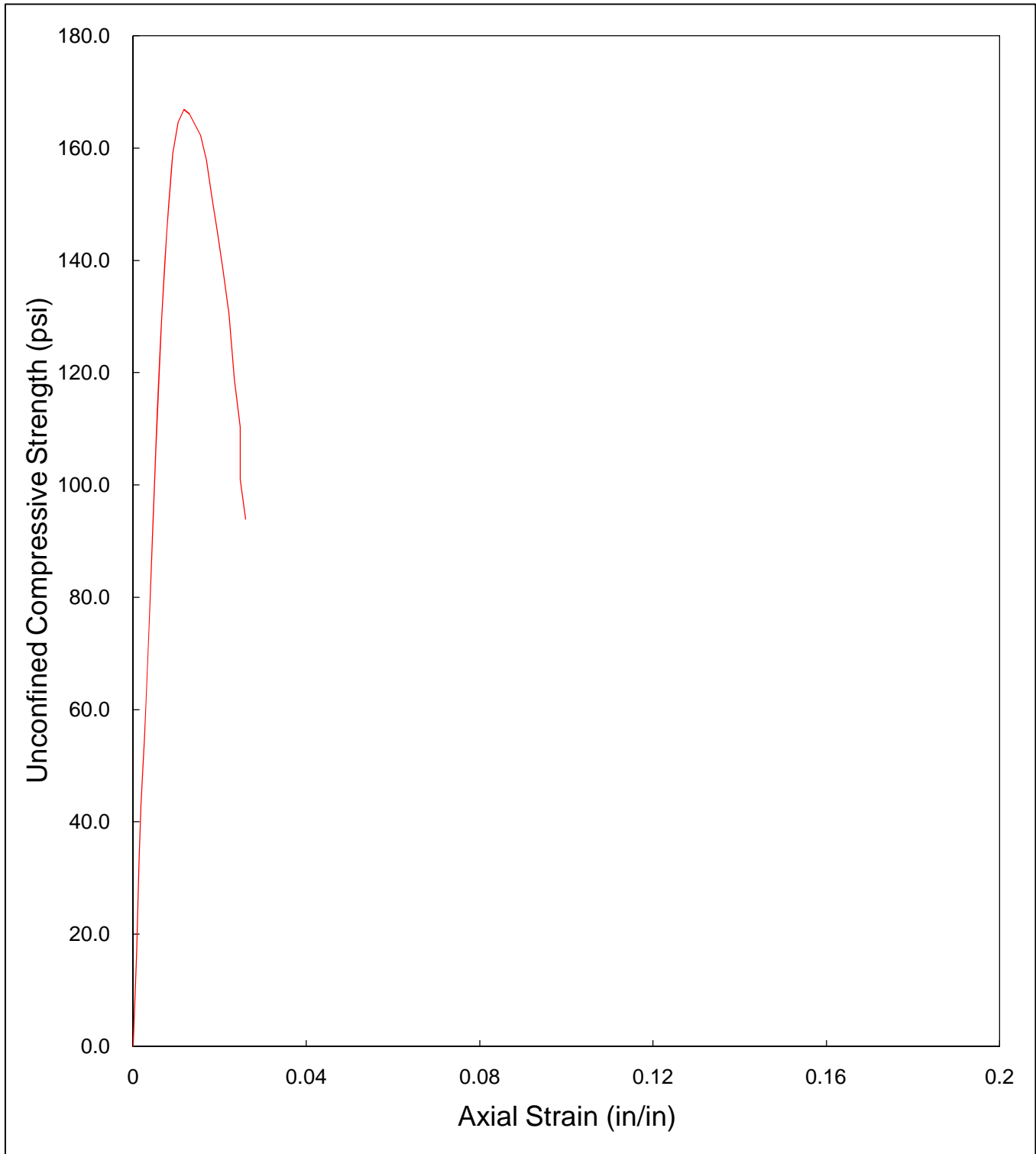
LOADING RATE: 0.04 in./min.  
TRACKING CODE: 6206\_US

SOIL SPECIMEN DIMENSIONS		
	DIAMETER	LENGTH
No. 1	2.03 in.	3.86 in.
No. 2	2.03 in.	3.86 in.
No. 3	2.04 in.	3.86 in.
<b>Average</b>	<b>2.03 in.</b>	<b>3.86 in.</b>

[illegible]

# UNCONFINED COMPRESSION TESTING

Sample No. 0301-030(28 Day)



# UNCONFINED COMPRESSION TEST

ASTM D 2166  
SUMMARY OF RESULTS

PROJECT:	Norwich MPG		
PROJECT No.:	SE-0301		
SAMPLE No.:	0301-030(28 Day)		
TESTING DATE:	8/26/2009	LOADING RATE:	0.04 in./min.
TESTED BY:	KG	TRACKING CODE:	6206_US

TESTING PARAMETER AND RESULTS	
MOISTURE CONTENT	27.0 %
BULK UNIT WEIGHT	90.1 lb/ft³
DRY UNIT WEIGHT	71.0 lb/ft³
UCS *	166.8 lb/in²

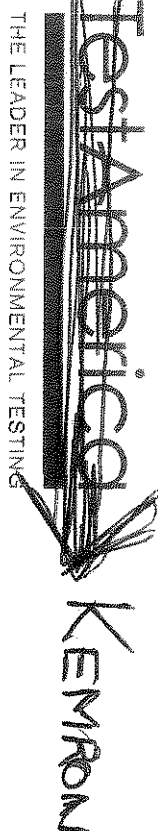
\* UCS - UNCONFINED COMPRESSIVE STRENGTH

**APPENDIX F**  
**CHAIN OF CUSTODY**

# Chain of Custody Record

TA-4124 (1007)

Temperature on Receipt \_\_\_\_\_  
Drinking Water? Yes ☐ No ☒



Client

AECOM

Project Manager

Scott Underhill

Date

4/3/09

Chain of Custody Number

111367

Address

40 ZENITH AMERICAN BLD.

Telephone Number (Area Code/Fax Number)

518-951-2200

Lab Number

Page 1 of 1

City

Albany NY 12110

Site Contact

Jesse Lopez

Lab Contact

Tommy Brown

Project Name and Location (State)

Norwich PDE - Norwich, NY

Contract/Purchase Order/Quote No.

Sample I.D. No. and Description  
(Containers for each sample may be combined on one line)

Date

Time

Matrix

Containers & Preservatives

Analysis (Attach list if more space is needed)

Special Instructions/ Conditions of Receipt

SAND SILT UNIT (11-3.5')

4/1/09

1320

X

ISS

TREATABILITY STUDY

GRAIN SIZE

GRAVEL UNIT (15-17.5')

4/1/09

1500

X

ISS

TREATABILITY STUDY

GRAIN SIZE

FILL UNIT (4'-6')

4/2/09

1400

X

ISS

TREATABILITY STUDY

GRAIN SIZE

FILL UNIT COMPOSITE

4/3/09

1100

X

ISS

TREATABILITY STUDY

GRAIN SIZE

GRAVEL UNIT COMPOSITE

4/3/09

1110

X

ISS

TREATABILITY STUDY

GRAIN SIZE

SAND UNIT COMPOSITE

4/3/09

1120

X

ISS

TREATABILITY STUDY

GRAIN SIZE

ISS 2 SAND (4-5)

4/2/09

1445

X

ISS

TREATABILITY STUDY

GRAIN SIZE

ISS 2 GRAVEL (5-6)

4/2/09

1450

X

ISS

TREATABILITY STUDY

GRAIN SIZE

ISS 2 GRAVEL BOTTOM (8-10)

4/2/09

1500

X

ISS

TREATABILITY STUDY

GRAIN SIZE

ISS 1 SAND (6-7)

4/2/09

1130

X

ISS

TREATABILITY STUDY

GRAIN SIZE

ISS 1 SAND ISS 1 GRAVEL (7-8)

4/2/09

1140

X

ISS

TREATABILITY STUDY

GRAIN SIZE

ISS 1 GRAVEL BOTTOM (19-22)

4/2/09

1210

X

ISS

TREATABILITY STUDY

GRAIN SIZE

(A fee may be assessed if samples are retained longer than 1 month)

Possible Hazard Identification

☒ Non-Hazard

☐ Flammable

☐ Skin Irritant

☐ Poison B

☐ Unknown

☐ Return To Client

☐ Disposal By Lab

☐ Archive For \_\_\_\_\_ Months

Turn Around Time Required

☐ 24 Hours

☐ 48 Hours

☐ 7 Days

☐ 14 Days

☐ 21 Days

☒ Other

Leak time

QC Requirements (Specify)

1. Relinquished By

AECOM

Date

4/3/09

Time

Received By

Date

Time

2. Relinquished By

AECOM

Date

4/3/09

Time

Received By

Date

Time

3. Relinquished By

Date

Time

Received By

Date

Time

Comments

DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy



# Chain of Custody Record

Temperature on Receipt \_\_\_\_\_

# TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

TAL-4124 (1007)

Client

**AECOM**

Project Manager

**Scott Underhill**

Date

**4/3/09**

Chain of Custody Number

**111368**

Address

**40 British American Blvd.**

Telephone Number (Area Code)/Fax Number

**515-951-2200**

Lab Number

**4/3/09**

Page **2** of **2**

City

**ALBANY**

State

**NY**

Zip Code

**12110**

Project Name and Location (State)

**MENICHA TDI**

Site Contact

**Jesse L. Wood**

Lab Contact

**Tommy Jordan**

Carrier/Vehicle Number

Contract/Purchase Order/Quote No.

Sample I.D. No. and Description

(Containers for each sample may be combined on one line)

Date

Time

Air

Aqueous

Sed.

Soil

Unpres.

H<sub>2</sub>SO<sub>4</sub>

HNO<sub>3</sub>

HCl

NaOH

ZnAc<sub>2</sub>

NaOH

Matrix

Containers & Preservatives

GRAIN SIZE

Analysis (Attach list if more space is needed)

Special Instructions/  
Conditions of Receipt

Possible Hazard Identification

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison & ☒ Unknown

☐ Return To Client

☒ Disposal By Lab ☐ Archive For \_\_\_\_\_ Months

(A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required

☐ 24 Hours ☐ 48 Hours ☐ 7 Days ☐ 14 Days ☐ 21 Days ☒ Other

**Reactive**

QC Requirements (Specify)

1. Relinquished By

**[Signature]**

Date

**4/3/09**

Time

**1430**

1. Received By

**[Signature]**

Date

**4/3/09**

Time

**1045**

2. Relinquished By

**[Signature]**

Date

**4/3/09**

Time

**1430**

2. Received By

**[Signature]**

Date

**4/3/09**

Time

**1045**

3. Relinquished By

**[Signature]**

Date

**4/3/09**

Time

**1430**

3. Received By

**[Signature]**

Date

**4/3/09**

Time

**1045**

Comments

DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy

## **ISS Performance Data**



# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

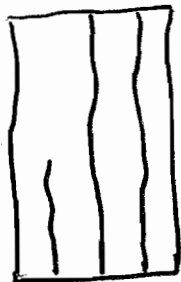
ATL Report No. AT1573SL-01-12-10

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 14-26

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	12/02/10
Date of Test	12/09/10
Age of Sample at Test Date	7 days
Initial Dry Density (pcf)	69.6
Initial Water Content (%)	52.0
Unconfined Compressive Strength (psi)	193.2
Average Height (in.)	5.433
Average Diameter (in.)	3.00
Height-to-Diameter Ratio	1.81
Average Rate of Strain (%/min)	0.99
Strain at Failure (%)	1.7
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 12/13/10



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-01-12-10**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

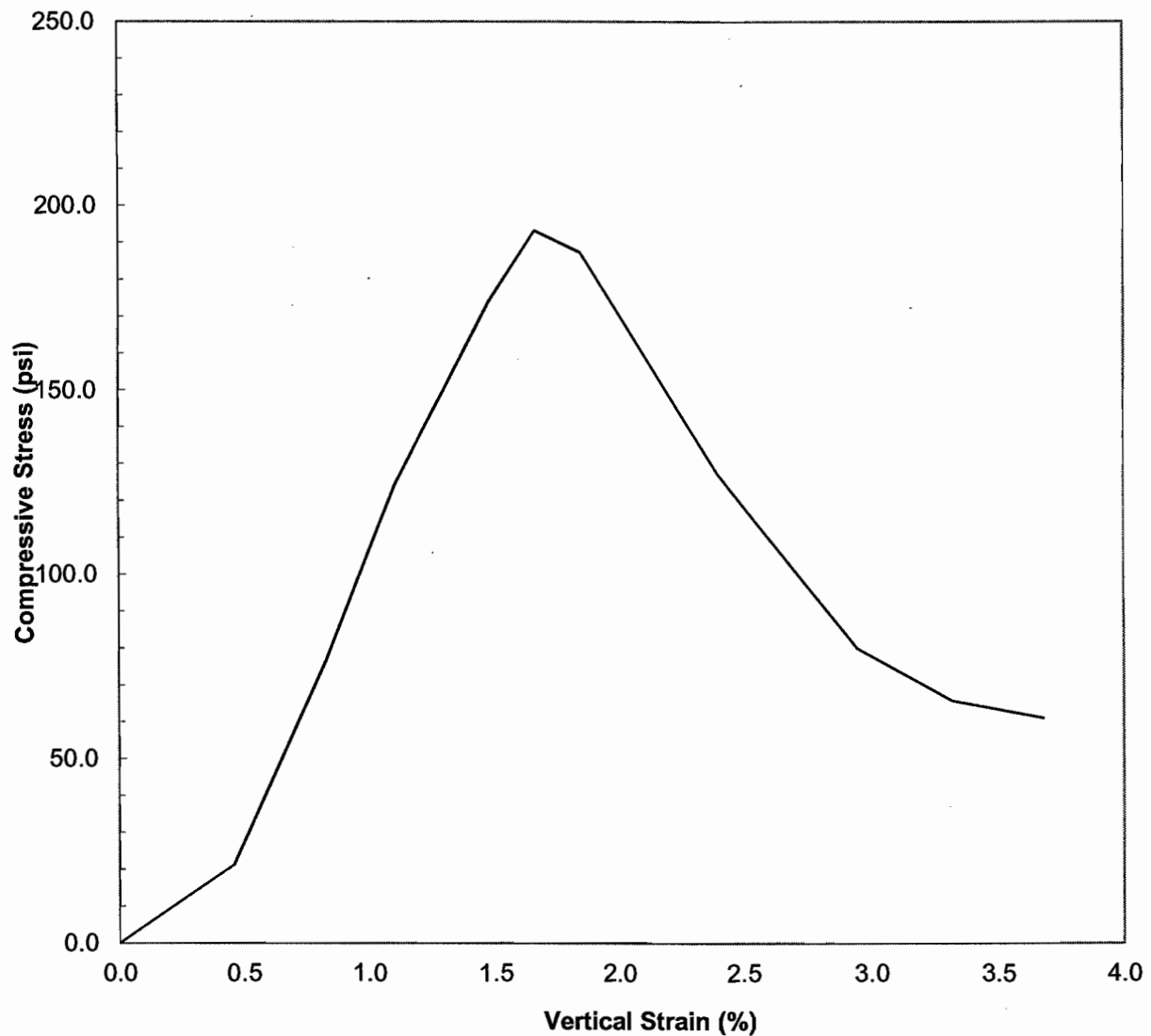
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 14-26**

**Depth: N/A**

**ATL Sample No. AT1573S01**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

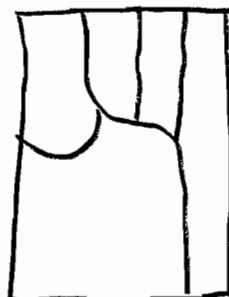
ATL Report No. AT1573SL-02-12-10

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 14-27

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	12/02/2010
Date of Test	12/09/2010
Age of Sample at Test Date	7 days
Initial Dry Density (pcf)	67.4
Initial Water Content (%)	53.2
Unconfined Compressive Strength (psi)	195.6
Average Height (in.)	5.551
Average Diameter (in.)	3.001
Height-to-Diameter Ratio	1.85
Average Rate of Strain (%/min)	1.00
Strain at Failure (%)	1.7
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 12/13/10



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-02-12-10**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

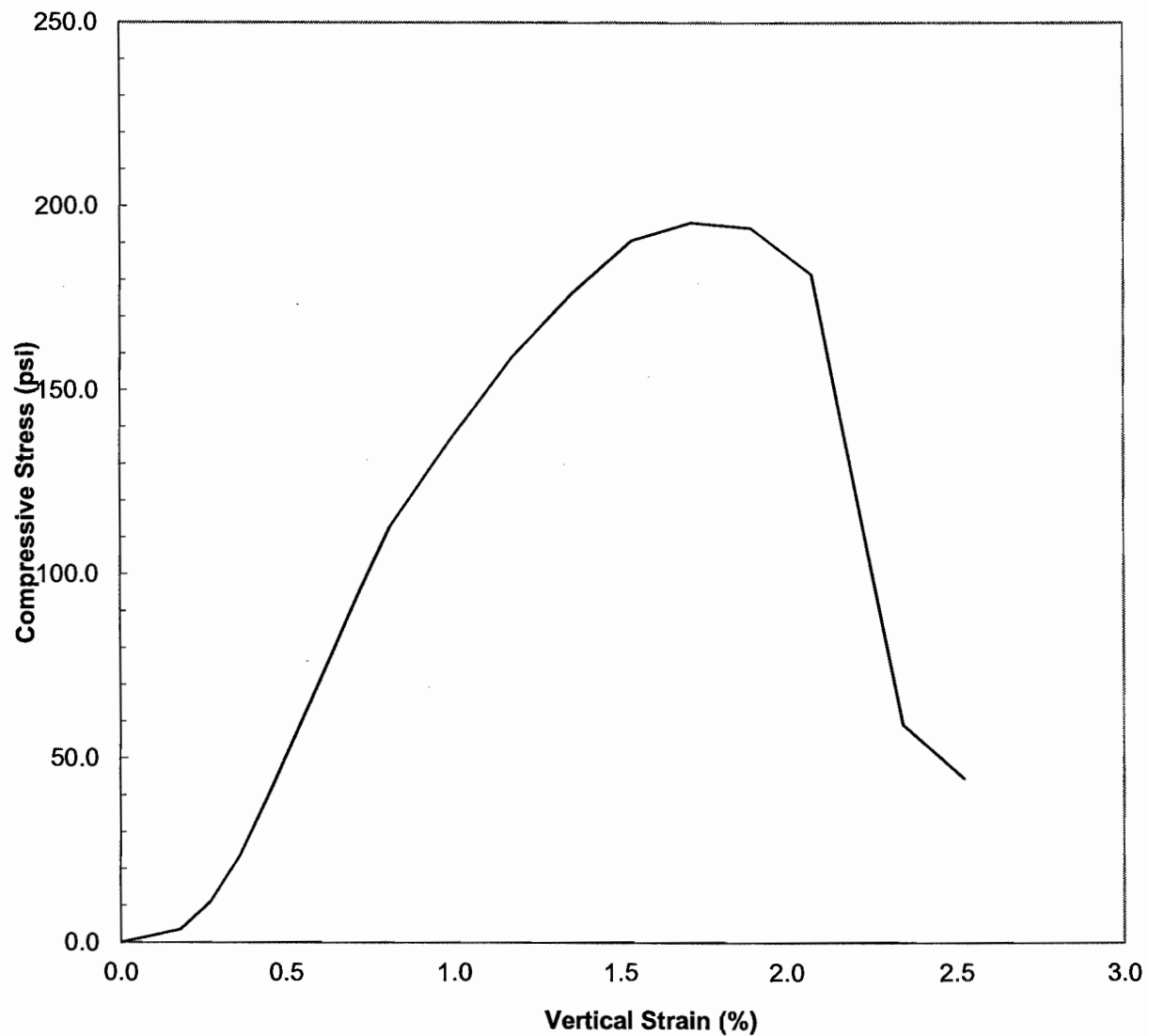
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 14-27**

**Depth: N/A**

**ATL Sample No. AT1573S02**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

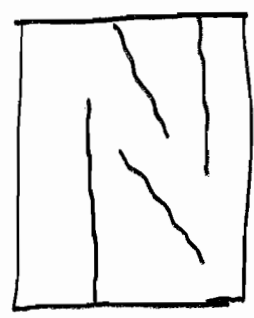
ATL Report No. AT1573SL-03-12-10

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 14-28

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	12/03/2010
Date of Test	12/10/2010
Age of Sample at Test Date	7 days
Initial Dry Density (pcf)	67.7
Initial Water Content (%)	52.3
Unconfined Compressive Strength (psi)	129.5
Average Height (in.)	5.512
Average Diameter (in.)	3.009
Height-to-Diameter Ratio	1.83
Average Rate of Strain (%/min)	0.82
Strain at Failure (%)	1.9
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 12/13/10



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-03-12-10**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

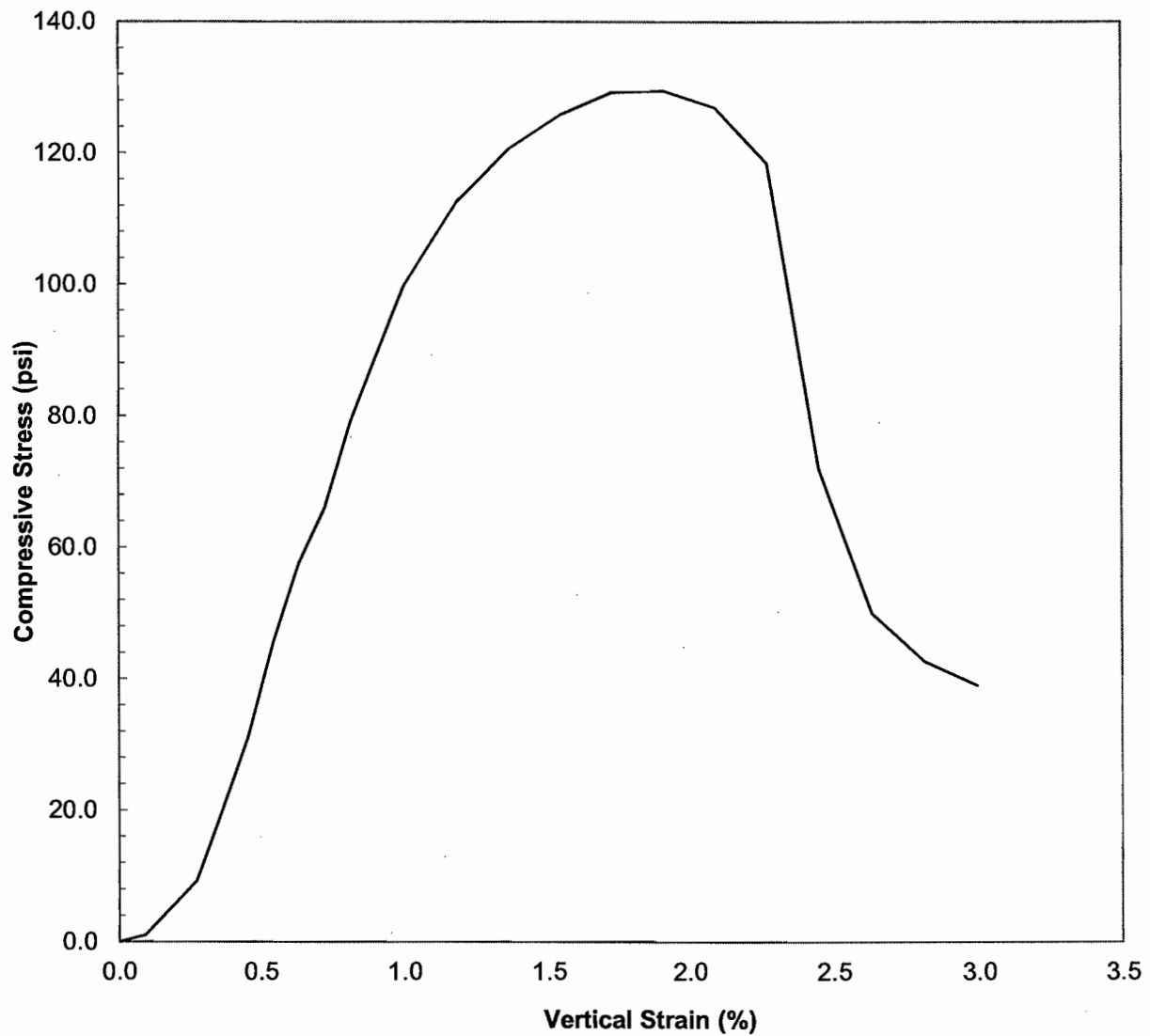
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 14-28**

**Depth: N/A**

**ATL Sample No. AT1573S03**







# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

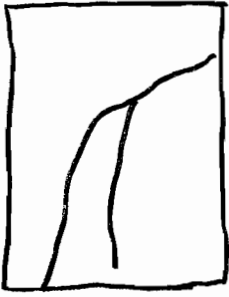
ATL Report No. AT1573SL-04-12-10

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 13-30

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	12/04/2010
Date of Test	12/11/2010
Age of Sample at Test Date	7 days
Initial Dry Density (pcf)	69.5
Initial Water Content (%)	52.3
Unconfined Compressive Strength (psi)	102.9
Average Height (in.)	5.315
Average Diameter (in.)	2.990
Height-to-Diameter Ratio	1.78
Average Rate of Strain (%/min)	0.85
Strain at Failure (%)	1.5
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 12/13/10



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-04-12-10**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

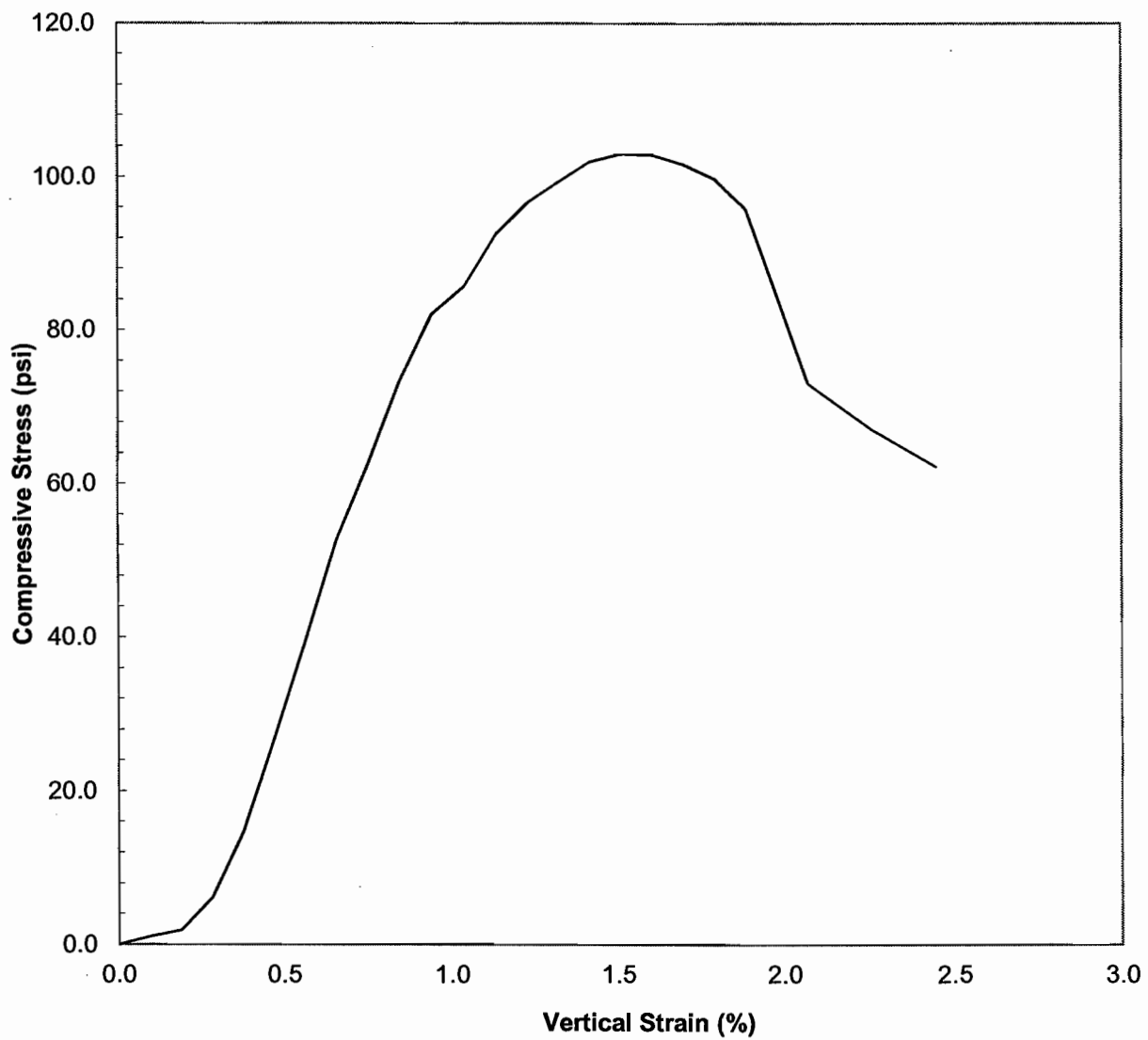
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 13-30**

**Depth: N/A**

**ATL Sample No. AT1573S04**





# ATLANTIC TESTING LABORATORIES

**Albany**  
22 Corporate Drive  
Clifton Park, NY 12065  
518-383-9144 (T)  
518-383-9166 (F)

## TRANSMITTAL

December 14, 2010

AECOM  
40 British American Boulevard  
Latham, New York 12110

Attn: Mr. Scott Serviss

E/Mail: [scott.serviss@aecom.com](mailto:scott.serviss@aecom.com)

Re: Soil Laboratory Testing  
NGP Site  
Norwich, New York  
ATL Project No.: AT1573

Dear Mr. Serviss:

Enclosed are the following reports:

AT1573SL-05-12-10 Unconfined Compressive Strength December 10, 2010

Please contact our office should you have any questions or if we may be of further service.

Sincerely,

ATLANTIC TESTING LABORATORIES, Limited

Robert E. Field  
Laboratory Manager  
[bfield@atlantictesting.com](mailto:bfield@atlantictesting.com)

REF/nd

Enclosures



# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

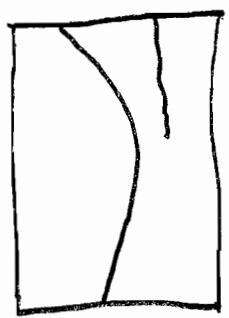
ATL Report No. AT1573SL-05-12-10

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 12-30

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	12/6/10
Date of Test	12/13/10
Age of Sample at Test Date	7 days
Initial Dry Density (pcf)	66.3
Initial Water Content (%)	54.7
Unconfined Compressive Strength (psi)	63.3
Average Height (in.)	5.394
Average Diameter (in.)	3.007
Height-to-Diameter Ratio	1.79
Average Rate of Strain (%/min)	0.84
Strain at Failure (%)	1.8
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 12/14/10



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-05-12-10**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

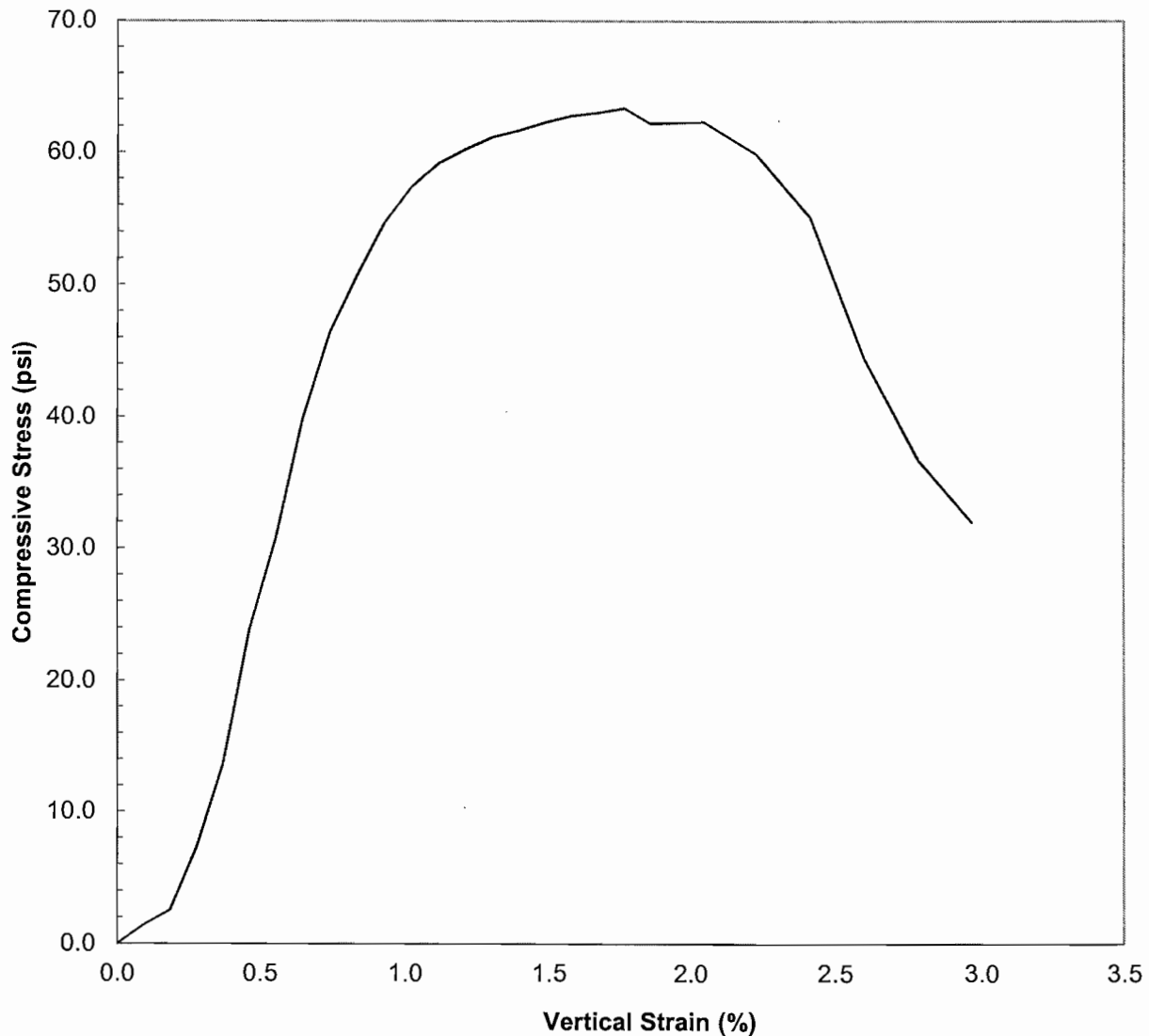
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 12-30**

**Depth: N/A**

**ATL Sample No. AT1573S05**





# ATLANTIC TESTING LABORATORIES

**Albany**  
22 Corporate Drive  
Clifton Park, NY 12065  
518-383-9144 (T)  
518-383-9166 (F)

## TRANSMITTAL

December 15, 2010

AECOM  
40 British American Boulevard  
Latham, New York 12110

Attn: Mr. Scott Serviss

E/Mail: [scott.serviss@aecom.com](mailto:scott.serviss@aecom.com)

Re: Soil Laboratory Testing  
NGP Site  
Norwich, New York  
ATL Project No.: AT1573

Dear Mr. Serviss:

Enclosed are the following reports:

AT1573SL-02A-12-10	Hydraulic Conductivity	December 7, 2010
AT1573SL-06-12-10	Unconfined Compressive Strength	December 10, 2010

Please contact our office should you have any questions or if we may be of further service.

Sincerely,  
ATLANTIC TESTING LABORATORIES, Limited

Robert E. Field  
Laboratory Manager  
[bfield@atlantictesting.com](mailto:bfield@atlantictesting.com)

REF/nd

Enclosures



# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

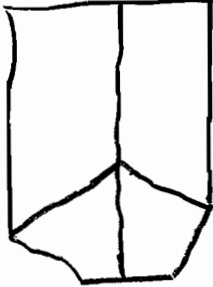
ATL Report No. AT1573SL-06-12-10

Client: AECOM


Project: NGP Site, Norwich, New York

Sample ID.: 11-30

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	12/7/10
Date of Test	12/14/10
Age of Sample at Test Date	7 days
Initial Dry Density (pcf)	70.6
Initial Water Content (%)	48.4
Unconfined Compressive Strength (psi)	119.6
Average Height (in.)	5.709
Average Diameter (in.)	3.003
Height-to-Diameter Ratio	1.90
Average Rate of Strain (%/min)	0.74
Strain at Failure (%)	1.6
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 12/15/10



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-06-12-10**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

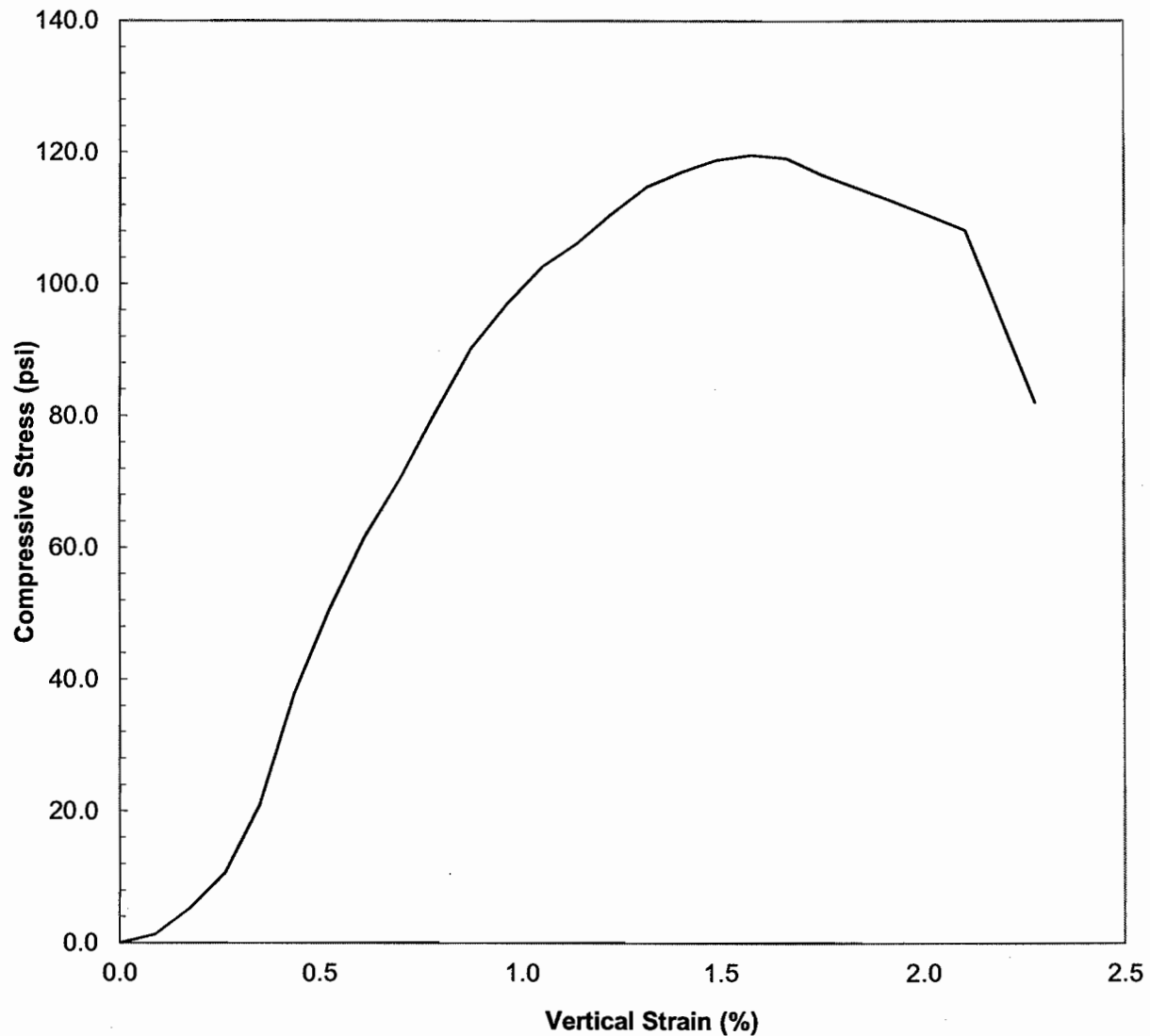
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 11-30**

**Depth: N/A**

**ATL Sample No. AT1573S06**







# ATLANTIC TESTING LABORATORIES

**Albany**  
22 Corporate Drive  
Clifton Park, NY 12065  
518-383-9144 (T)  
518-383-9166 (F)

## TRANSMITTAL

December 16, 2010

AECOM  
40 British American Boulevard  
Latham, New York 12110

Attn: Mr. Scott Serviss

E/Mail: [scott.serviss@aecom.com](mailto:scott.serviss@aecom.com)

Re: Soil Laboratory Testing  
NGP Site  
Norwich, New York  
ATL Project No.: AT1573

Dear Mr. Serviss:

Enclosed are the following reports:

AT1573SL-01A-12-10	Hydraulic Conductivity	December 13, 2010
AT1573SL-03A-12-10	Hydraulic Conductivity	December 13, 2010
AT1573SL-07-12-10	Unconfined Compressive Strength	December 10, 2010
AT1573SL-08-12-10	Unconfined Compressive Strength	December 10, 2010

Please contact our office should you have any questions or if we may be of further service.

Sincerely,  
ATLANTIC TESTING LABORATORIES, Limited

Robert E. Field  
Laboratory Manager  
[bfield@atlantictesting.com](mailto:bfield@atlantictesting.com)

REF/nd

Enclosures



# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166


ATL Report No. AT1573SL-08-12-10

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 6-29

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	12/8/10
Date of Test	12/15/10
Age of Sample at Test Date	7 days
Initial Dry Density (pcf)	69.1
Initial Water Content (%)	51.2
Unconfined Compressive Strength (psi)	165.8
Average Height (in.)	5.709
Average Diameter (in.)	3.003
Height-to-Diameter Ratio	1.90
Average Rate of Strain (%/min)	0.70
Strain at Failure (%)	1.8
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 12/16/10



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-08-12-10**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

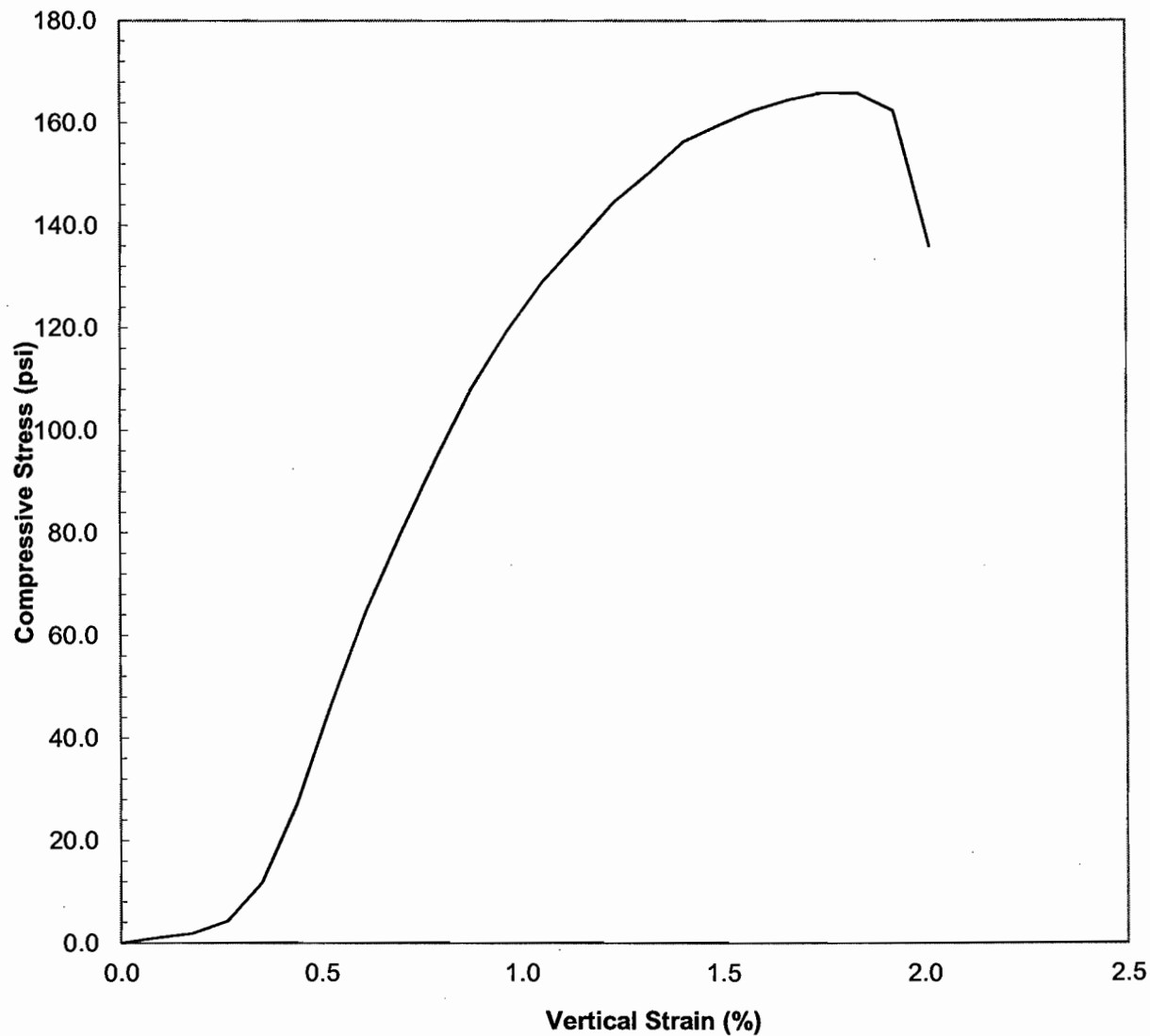
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 6-29**

**Depth: N/A**

**ATL Sample No. AT1573S08**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166


ATL Report No. AT1573SL-07-12-10

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: T6-20

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	12/8/10
Date of Test	12/15/10
Age of Sample at Test Date	7 days
Initial Dry Density (pcf)	80.0
Initial Water Content (%)	39.6
Unconfined Compressive Strength (psi)	204.8
Average Height (in.)	5.669
Average Diameter (in.)	3.000
Height-to-Diameter Ratio	1.89
Average Rate of Strain (%/min)	0.71
Strain at Failure (%)	1.8
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 12/16/10



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-07-12-10**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

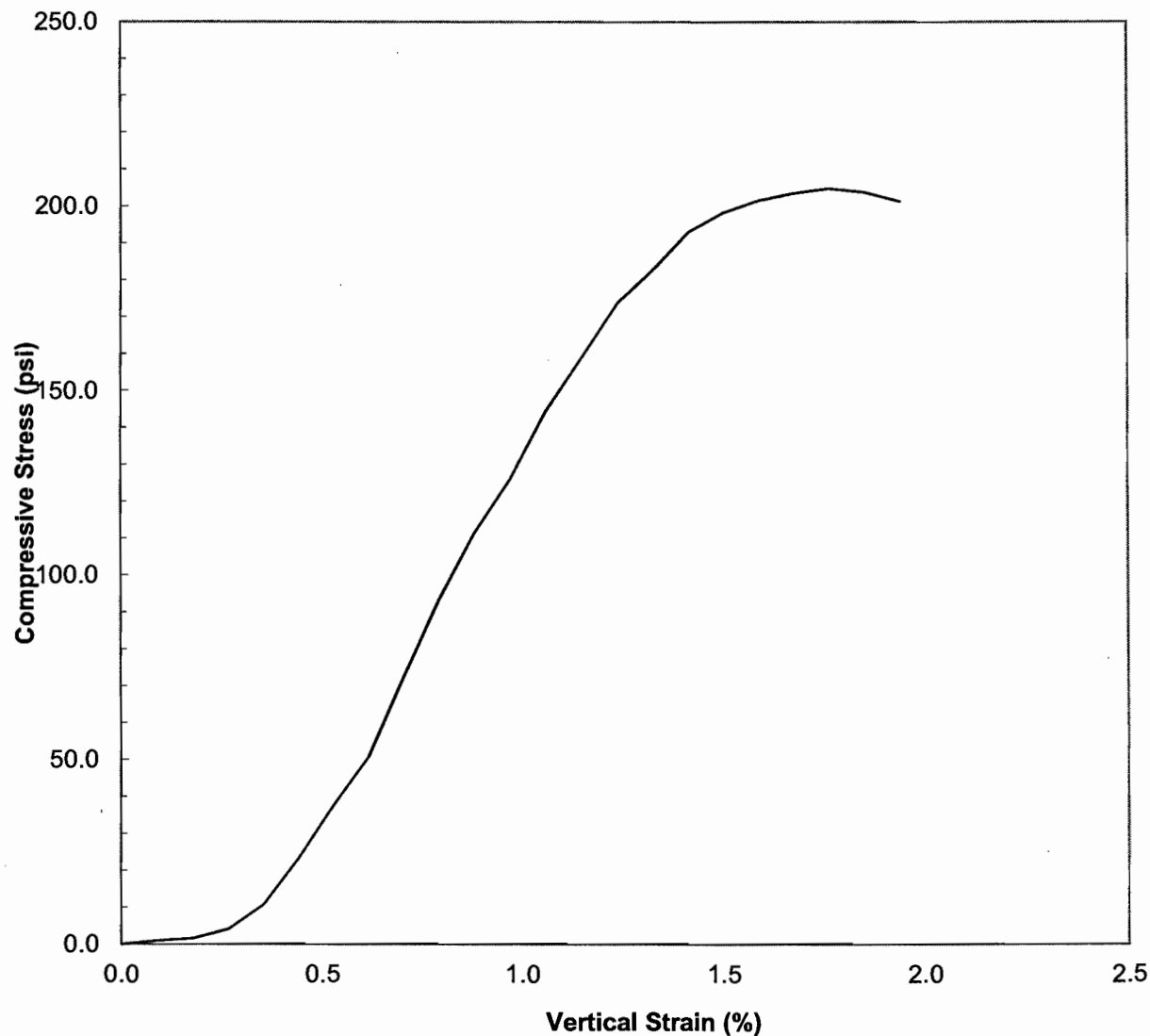
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: T6-20**

**Depth: N/A**

**ATL Sample No. AT1573S07**





# ATLANTIC TESTING LABORATORIES

**Albany**  
22 Corporate Drive  
Clifton Park, NY 12065  
518-383-9144 (T)  
518-383-9166 (F)

## TRANSMITTAL

December 19, 2010

AECOM  
40 British American Boulevard  
Latham, New York 12110

Attn: Mr. Scott Serviss

E/Mail: [scott.serviss@aecom.com](mailto:scott.serviss@aecom.com)

Re: Soil Laboratory Testing  
NGP Site  
Norwich, New York  
ATL Project No.: AT1573

Dear Mr. Serviss:

Enclosed are the following reports:

AT1573SL-01B-12-10	Unconfined Compressive Strength	December 07, 2010
AT1573SL-02B-12-10	Unconfined Compressive Strength	December 07, 2010
AT1573SL-03B-12-10	Unconfined Compressive Strength	December 07, 2010
AT1573SL-04B-12-10	Unconfined Compressive Strength	December 07, 2010
AT1573SL-09-12-10	Unconfined Compressive Strength	December 13, 2010
AT1573SL-10-12-10	Unconfined Compressive Strength	December 13, 2010
AT1573SL-11-12-10	Unconfined Compressive Strength	December 13, 2010
AT1573SL-12-12-10	Unconfined Compressive Strength	December 13, 2010
AT1573SL-13-12-10	Unconfined Compressive Strength	December 13, 2010
AT1573SL-14-12-10	Unconfined Compressive Strength	December 13, 2010

Please contact our office should you have any questions or if we may be of further service.

Sincerely,  
ATLANTIC TESTING LABORATORIES, Limited

Robert E. Field  
Laboratory Manager  
[bfield@atlantictesting.com](mailto:bfield@atlantictesting.com)

REF/nd

Enclosures



# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

ATL Report No. AT1573SL-09-12-10

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: T4-12

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	12/09/2010
Date of Test	12/16/2010
Age of Sample at Test Date	7 days
Initial Dry Density (pcf)	84.0
Initial Water Content (%)	35.6
Unconfined Compressive Strength (psi)	261.7
Average Height (in.)	5.551
Average Diameter (in.)	3.001
Height-to-Diameter Ratio	1.85
Average Rate of Strain (%/min)	0.68
Strain at Failure (%)	1.6
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by:

Date: 12/19/10



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-09-12-10**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

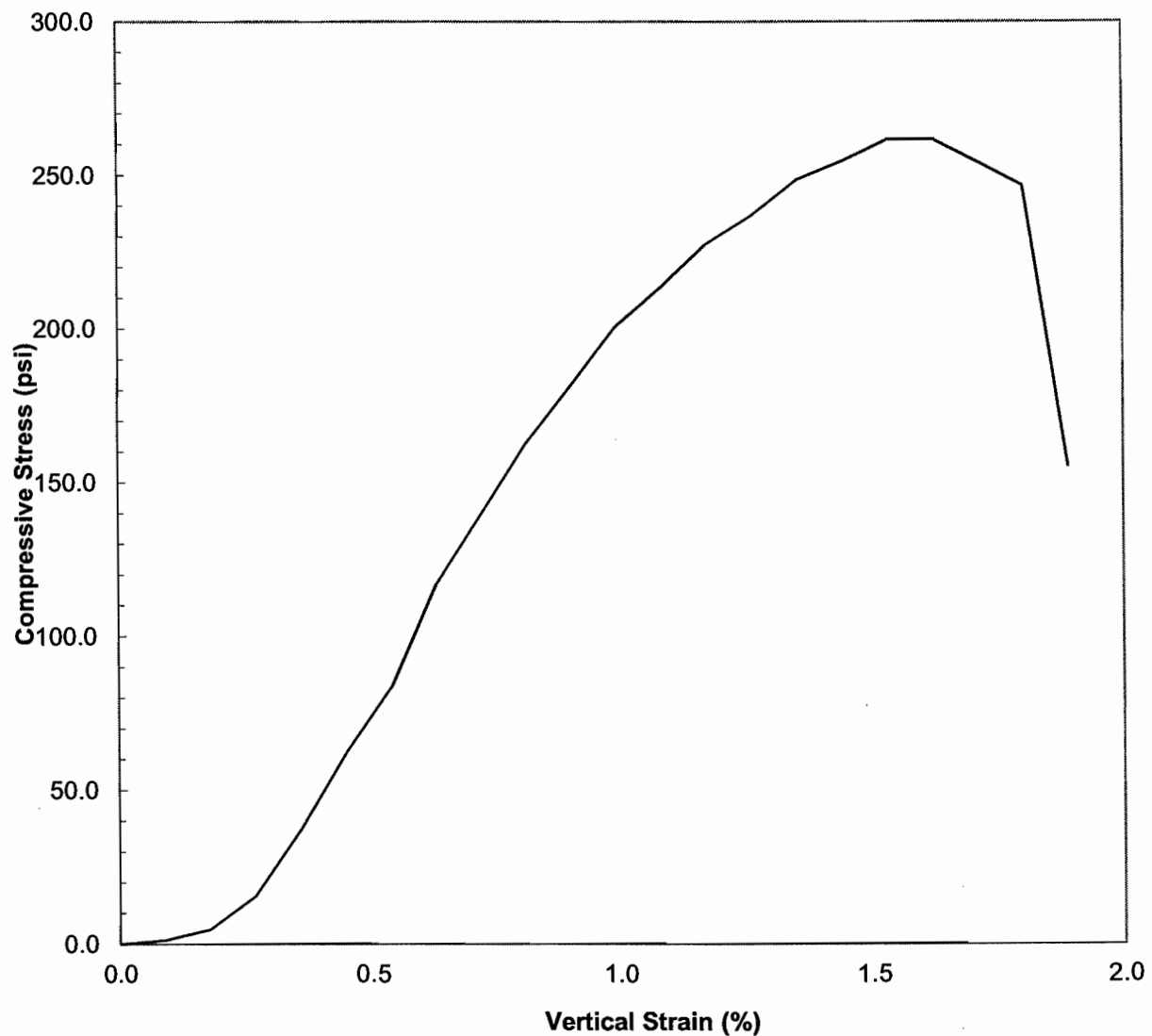
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: T4-12**

**Depth: N/A**

**ATL Sample No. AT1573S09**







# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166


ATL Report No. AT1573SL-10-12-10

Client: AECOM


Project: NGP Site, Norwich, New York

Sample ID.: 5-30

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	12/09/2010
Date of Test	12/16/2010
Age of Sample at Test Date	7 days
Initial Dry Density (pcf)	73.8
Initial Water Content (%)	46.7
Unconfined Compressive Strength (psi)	79.4
Average Height (in.)	5.354
Average Diameter (in.)	2.993
Height-to-Diameter Ratio	1.79
Average Rate of Strain (%/min)	0.60
Strain at Failure (%)	2.0
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 12/19/10



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-10-12-10**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

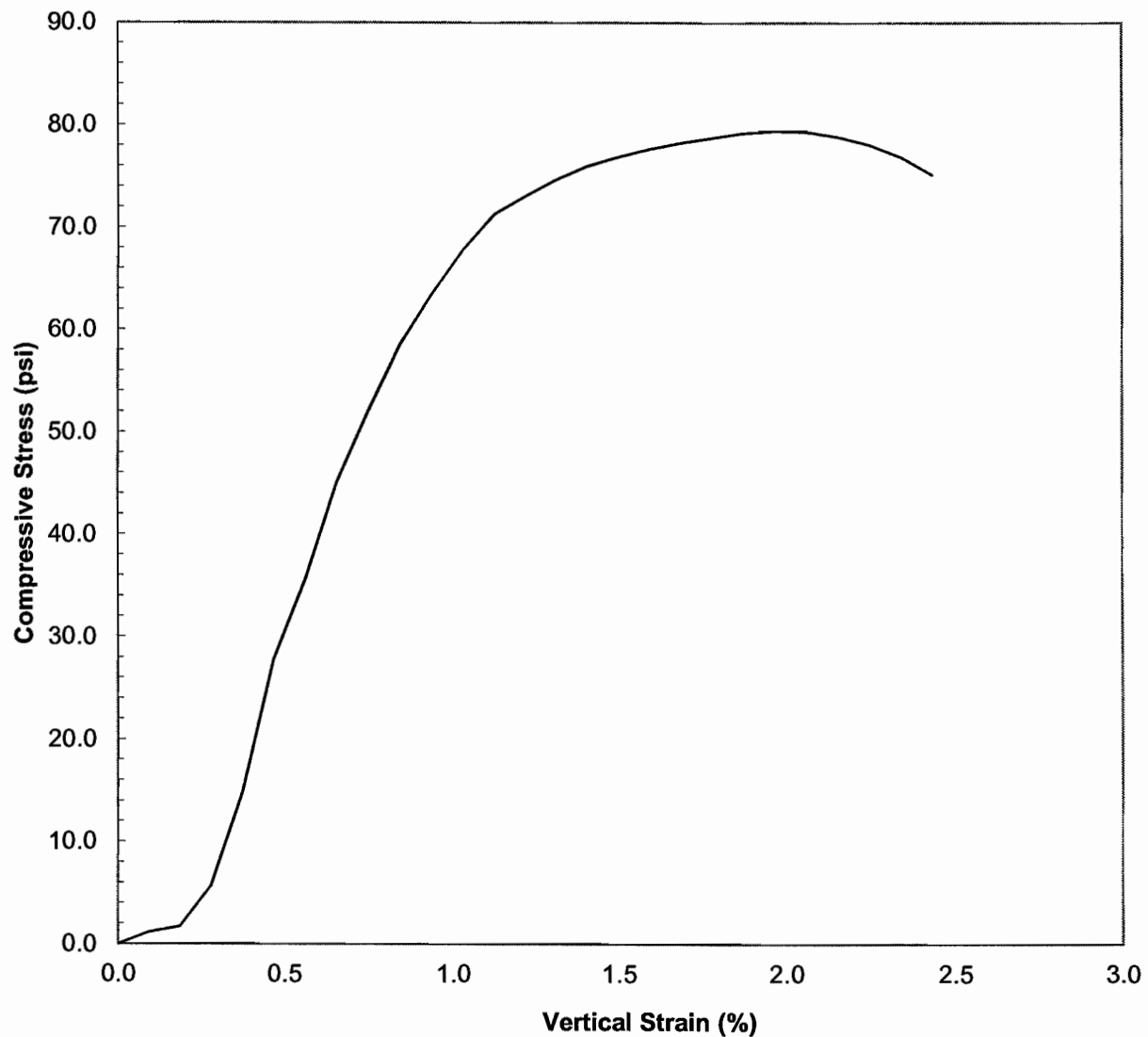
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 5-30**

**Depth: N/A**

**ATL Sample No. AT1573S010**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166


ATL Report No. AT1573SL-11-12-10

Client: \_\_\_\_\_ AECOM

Project: \_\_\_\_\_ NGP Site, Norwich, New York

Sample ID.: \_\_\_\_\_ T4-9

Sample Description: \_\_\_\_\_ Grout Column

Parameter	Results
Date Sample Cast	12/09/2010
Date of Test	12/16/2010
Age of Sample at Test Date	7 days
Initial Dry Density (pcf)	85.9
Initial Water Content (%)	33.9
Unconfined Compressive Strength (psi)	214.5
Average Height (in.)	5.512
Average Diameter (in.)	2.997
Height-to-Diameter Ratio	1.84
Average Rate of Strain (%/min)	0.58
Strain at Failure (%)	1.7
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by:  \_\_\_\_\_

Date: 12/19/10



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-11-12-10**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

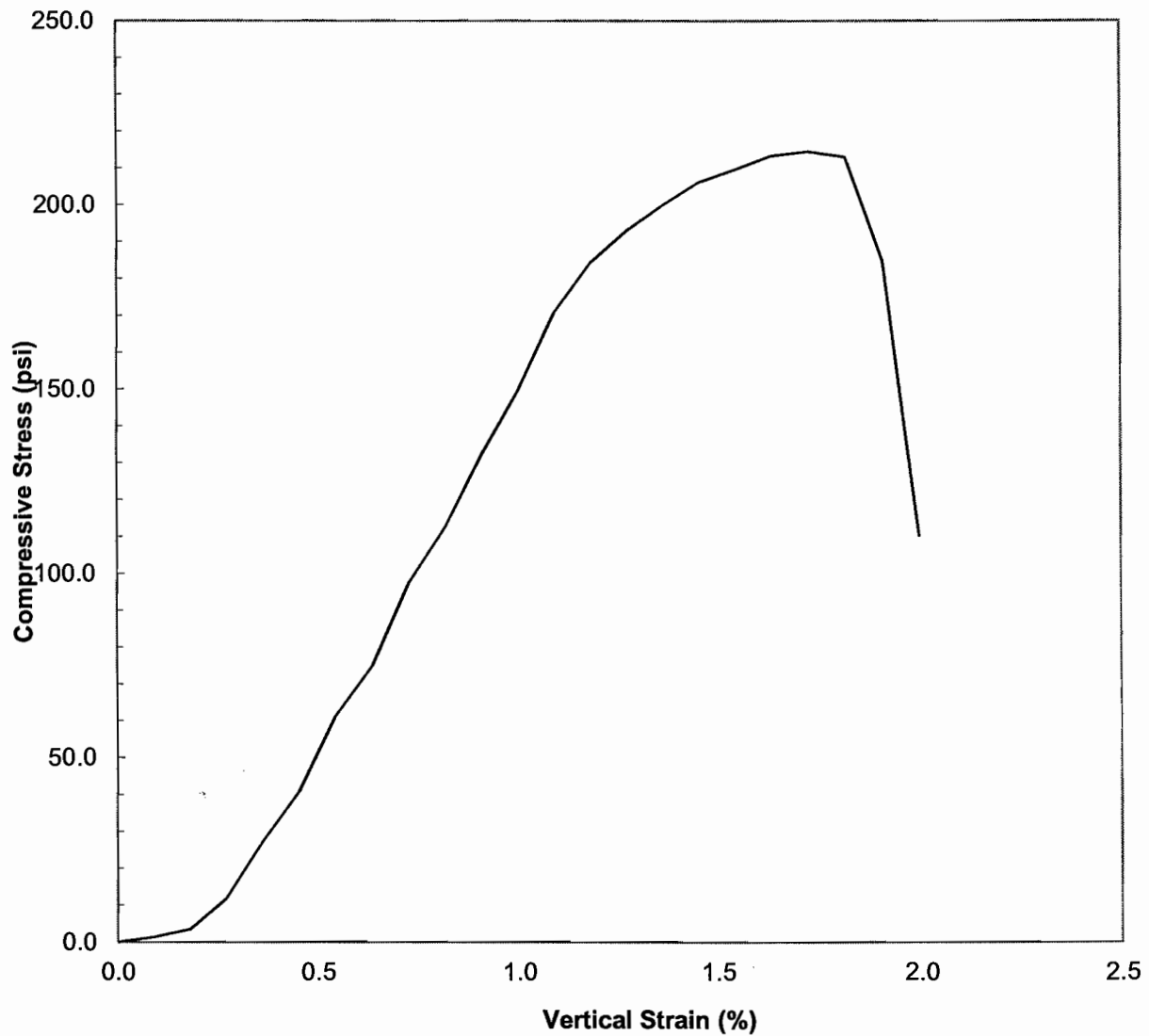
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: T4-9**

**Depth: N/A**

**ATL Sample No. AT1573S011**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

ATL Report No. AT1573SL-12-12-10

Client: \_\_\_\_\_ AECOM

Project: \_\_\_\_\_ NGP Site, Norwich, New York

Sample ID.: \_\_\_\_\_ T6-16

Sample Description: \_\_\_\_\_ Grout Column

Parameter	Results
Date Sample Cast	12/09/2010
Date of Test	12/16/2010
Age of Sample at Test Date	7 days
Initial Dry Density (pcf)	88.5
Initial Water Content (%)	31.4
Unconfined Compressive Strength (psi)	281.0
Average Height (in.)	5.630
Average Diameter (in.)	3.000
Height-to-Diameter Ratio	1.88
Average Rate of Strain (%/min)	0.53
Strain at Failure (%)	1.8
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by:

Date: 12/19/10



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-12-12-10**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

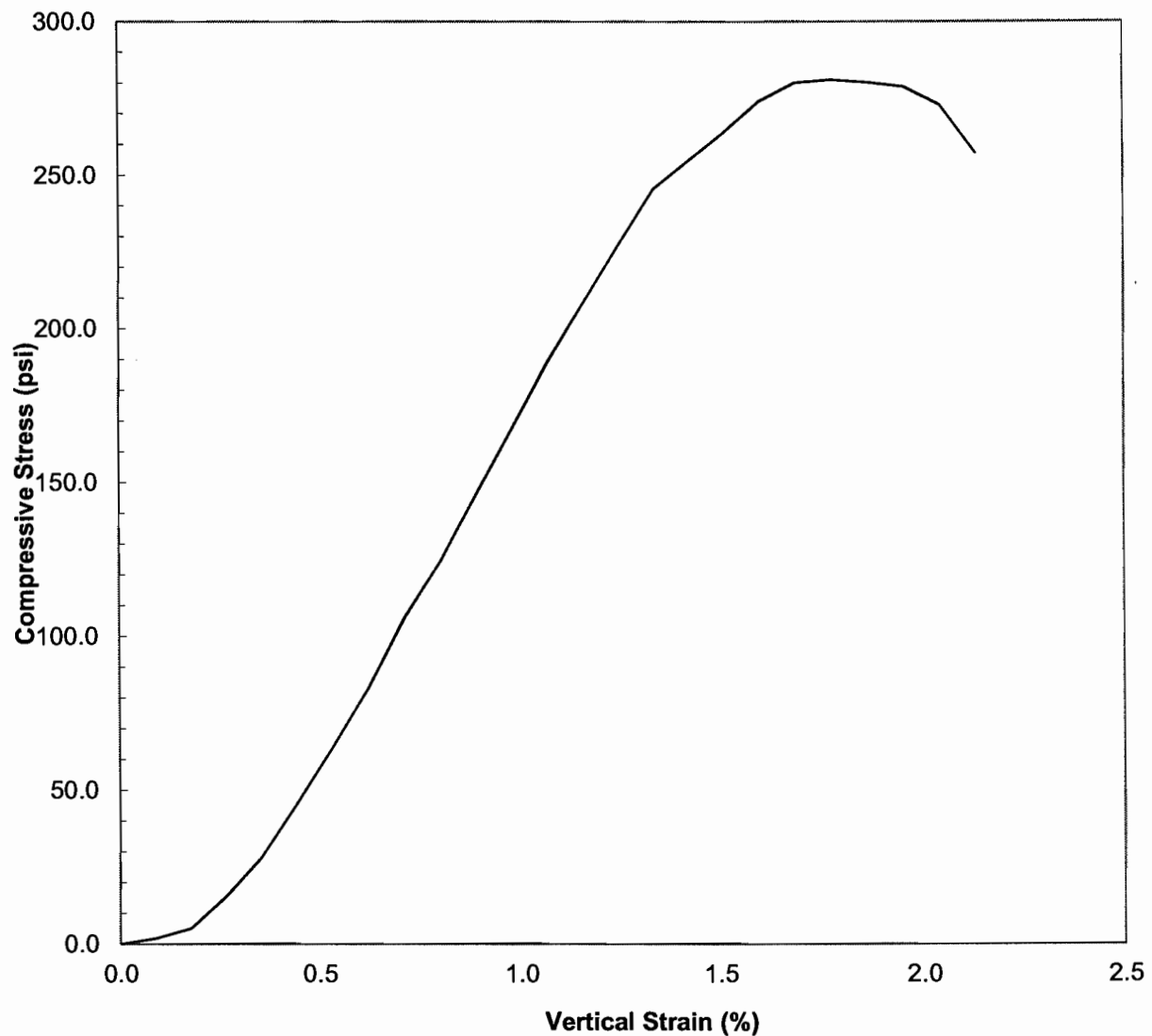
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: T6-16**

**Depth: N/A**

**ATL Sample No. AT1573S012**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

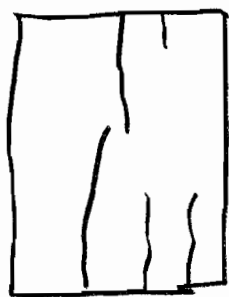
ATL Report No. AT1573SL-13-12-10

Client: \_\_\_\_\_ AECOM

Project: \_\_\_\_\_ NGP Site, Norwich, New York

Sample ID.: \_\_\_\_\_ 4-20

Sample Description: \_\_\_\_\_ Grout Column

Parameter	Results
Date Sample Cast	12/10/2010
Date of Test	12/17/2010
Age of Sample at Test Date	7 days
Initial Dry Density (pcf)	68.9
Initial Water Content (%)	51.7
Unconfined Compressive Strength (psi)	102.1
Average Height (in.)	5.551
Average Diameter (in.)	2.993
Height-to-Diameter Ratio	1.85
Average Rate of Strain (%/min)	0.54
Strain at Failure (%)	1.7
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by:  \_\_\_\_\_

Date: 12/19/10



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-13-12-10**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

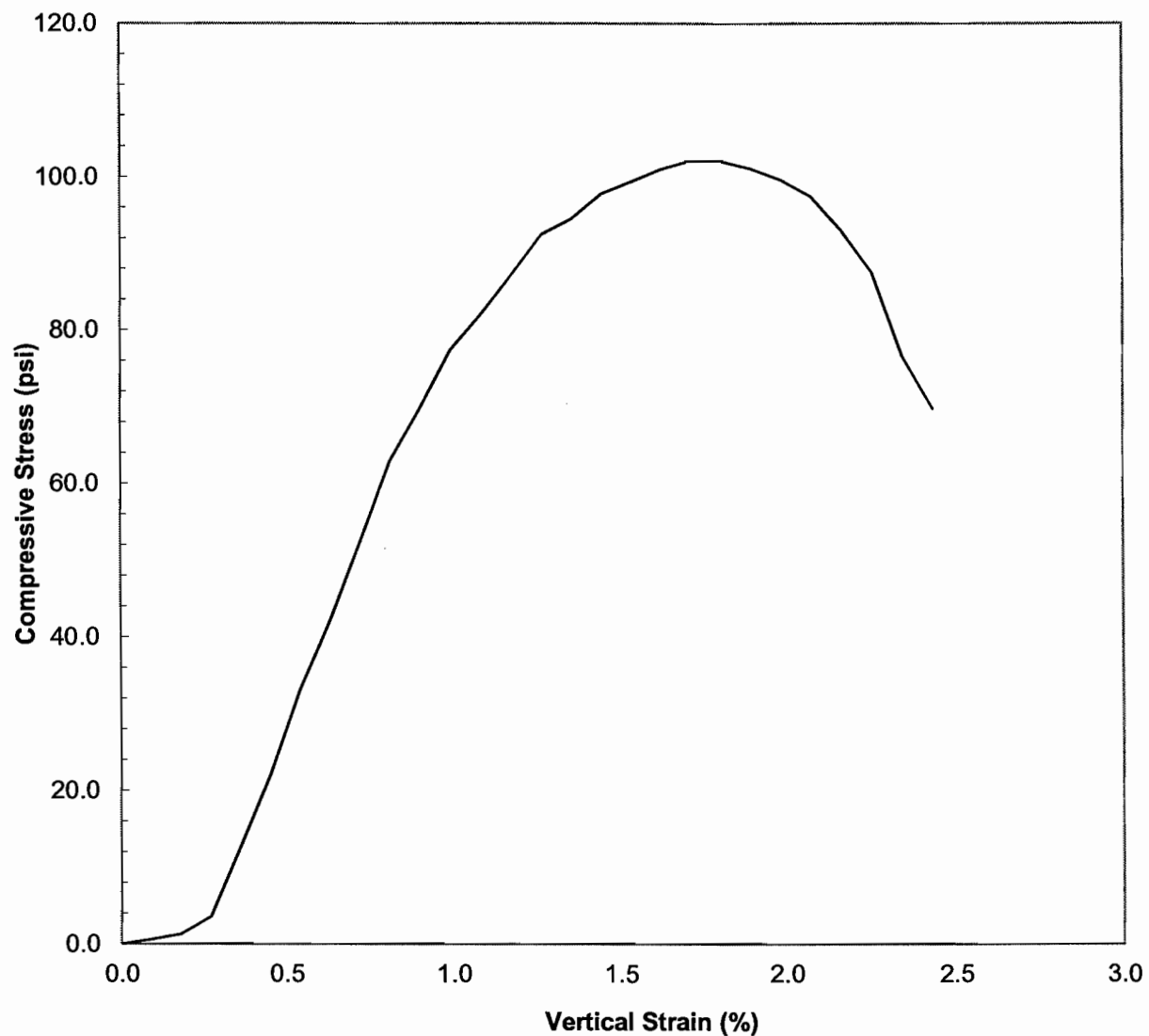
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 4-20**

**Depth: N/A**

**ATL Sample No. AT1573S013**







# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

ATL Report No. AT1573SL-14-12-10

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 5-25

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	12/11/2010
Date of Test	12/18/2010
Age of Sample at Test Date	7 days
Initial Dry Density (pcf)	65.7
Initial Water Content (%)	57.3
Unconfined Compressive Strength (psi)	94.3
Average Height (in.)	5.551
Average Diameter (in.)	3.003
Height-to-Diameter Ratio	1.85
Average Rate of Strain (%/min)	0.56
Strain at Failure (%)	1.2
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by:

Date: 12/18/10



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-14-12-10**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

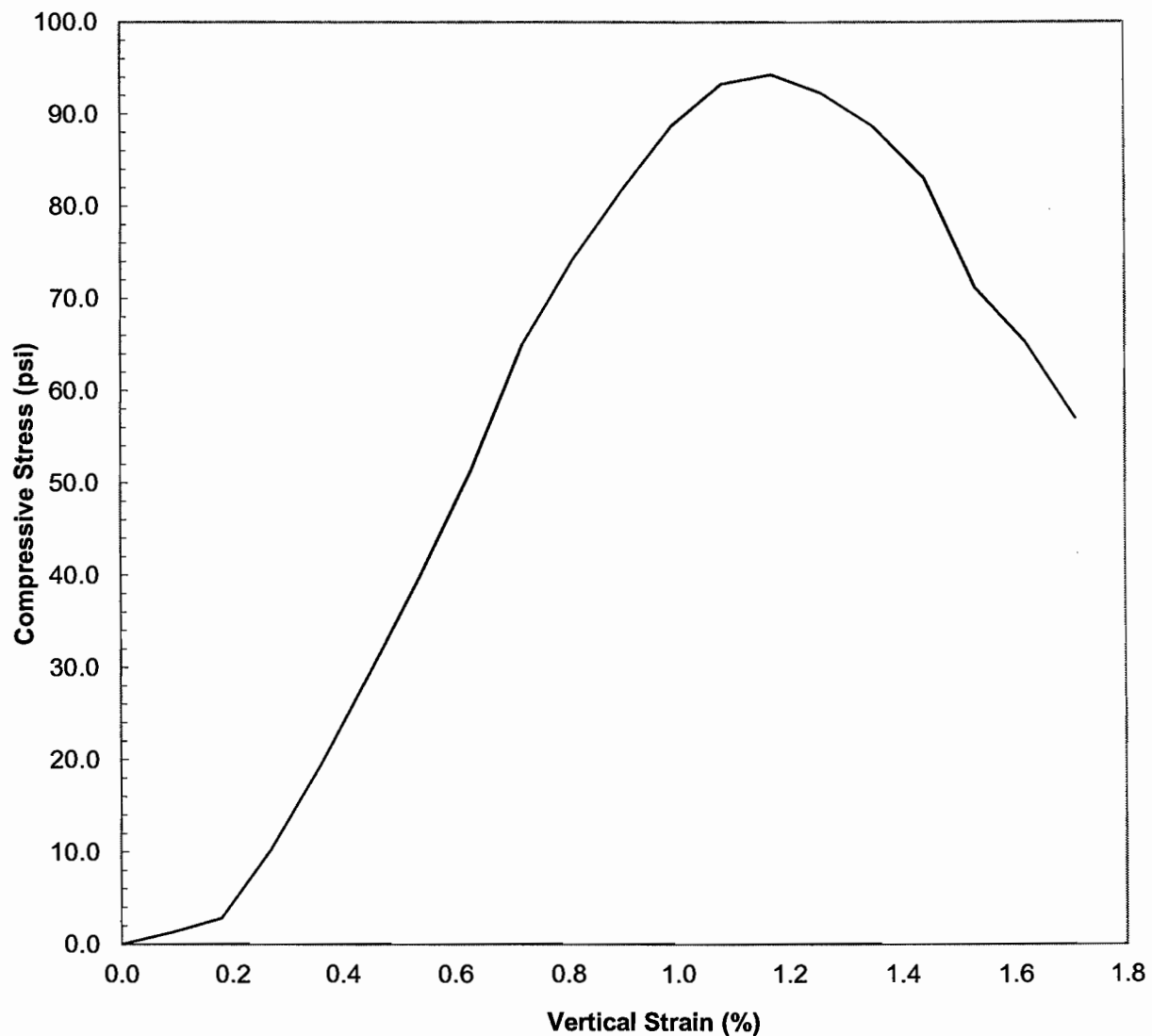
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 5-25**

**Depth: N/A**

**ATL Sample No. AT1573S014**





# ATLANTIC TESTING LABORATORIES

**Albany**  
22 Corporate Drive  
Clifton Park, NY 12065  
518-383-9144 (T)  
518-383-9166 (F)

## TRANSMITTAL

December 20, 2010

AECOM  
40 British American Boulevard  
Latham, New York 12110

Attn: Mr. Scott Serviss

E/Mail: [scott.serviss@aecom.com](mailto:scott.serviss@aecom.com)

Re: Soil Laboratory Testing  
NGP Site  
Norwich, New York  
ATL Project No.: AT1573

Dear Mr. Serviss:

Enclosed are the following reports:

AT1573SL-15-12-10      Unconfined Compressive Strength      December 16, 2010

Please contact our office should you have any questions or if we may be of further service.

Sincerely,  
*ATLANTIC TESTING LABORATORIES, Limited*

Robert E. Field  
Laboratory Manager  
[bfield@atlantictesting.com](mailto:bfield@atlantictesting.com)

REF/nd

Enclosures



# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

ATL Report No. AT1573SL-15-12-10

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 5-24

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	12/12/2010
Date of Test	12/19/2010
Age of Sample at Test Date	7 days
Initial Dry Density (pcf)	69.0
Initial Water Content (%)	51.4
Unconfined Compressive Strength (psi)	103.7
Average Height (in.)	5.591
Average Diameter (in.)	3.003
Height-to-Diameter Ratio	1.86
Average Rate of Strain (%/min)	0.72
Strain at Failure (%)	1.8
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by:

Date: 12/20/10



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-15-12-10**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

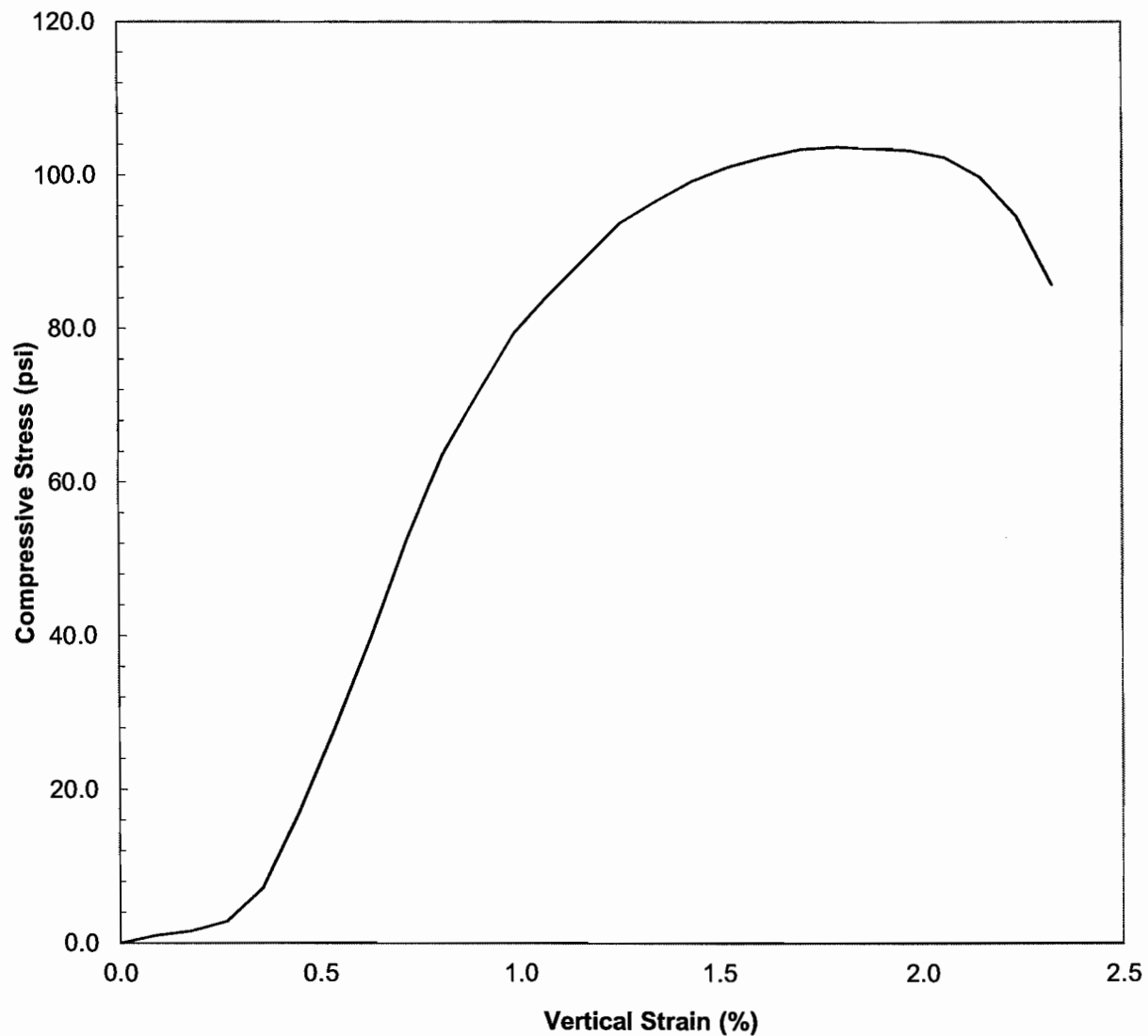
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 5-24**

**Depth: N/A**

**ATL Sample No. AT1573S015**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166


ATL Report No. AT1573SL-16-12-10

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 15-25

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	12/13/2010
Date of Test	12/20/10
Age of Sample at Test Date	7 days
Initial Dry Density (pcf)	68.7
Initial Water Content (%)	51.8
Unconfined Compressive Strength (psi)	78.1
Average Height (in.)	5.472
Average Diameter (in.)	2.996
Height-to-Diameter Ratio	1.83
Average Rate of Strain (%/min)	0.73
Strain at Failure (%)	1.5
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 12/21/10



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-16-12-10**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

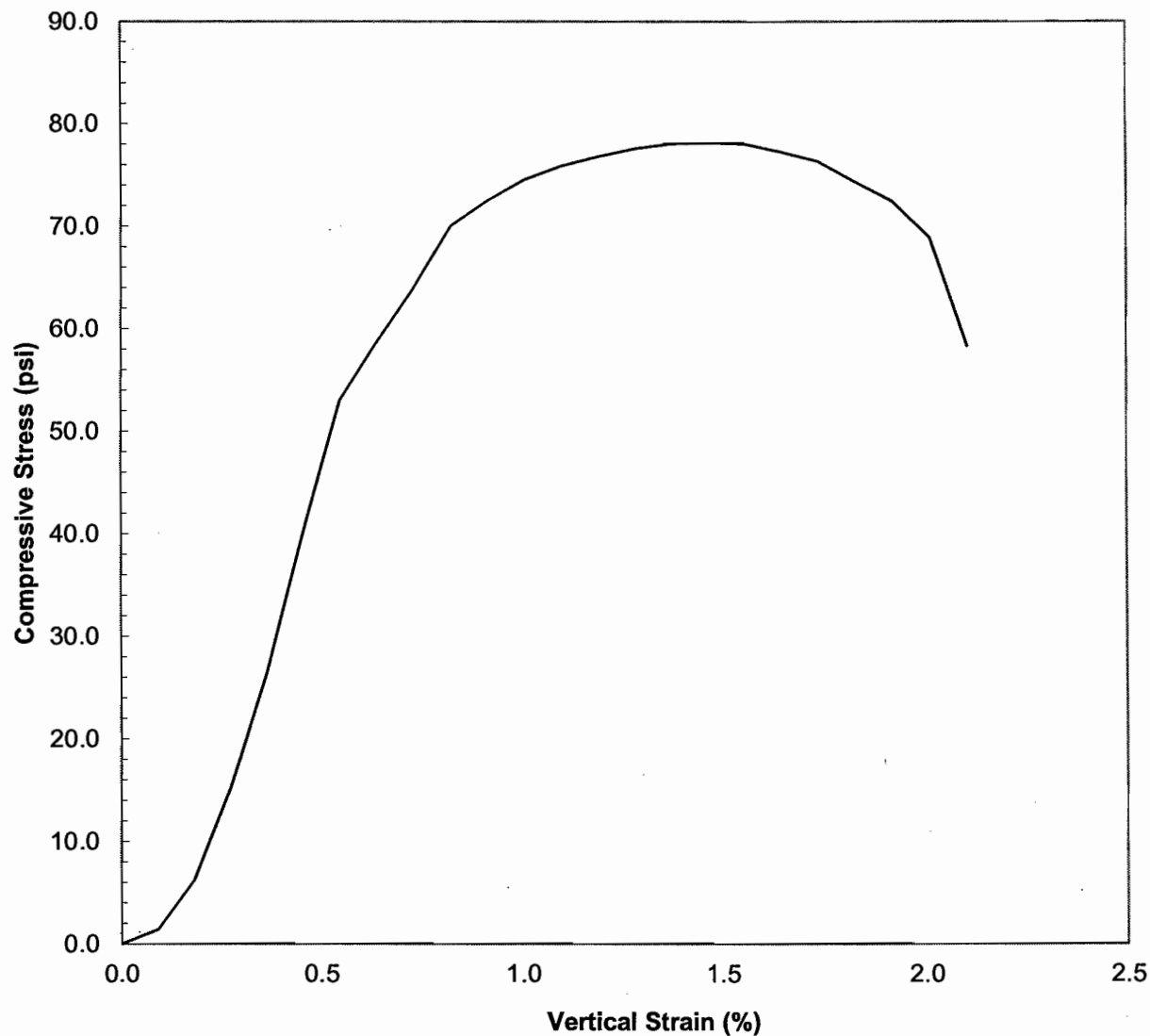
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 15-25**

**Depth: N/A**

**ATL Sample No. AT1573S016**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

ATL Report No. AT1573SL-17-12-10

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 17-24

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	12/14/2010
Date of Test	12/21/10
Age of Sample at Test Date	7 days
Initial Dry Density (pcf)	71.1
Initial Water Content (%)	49.2
Unconfined Compressive Strength (psi)	59.2
Average Height (in.)	5.551
Average Diameter (in.)	2.993
Height-to-Diameter Ratio	1.85
Average Rate of Strain (%/min)	0.72
Strain at Failure (%)	2.3
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by:

Date: 12/26/10





# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-17-12-10**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

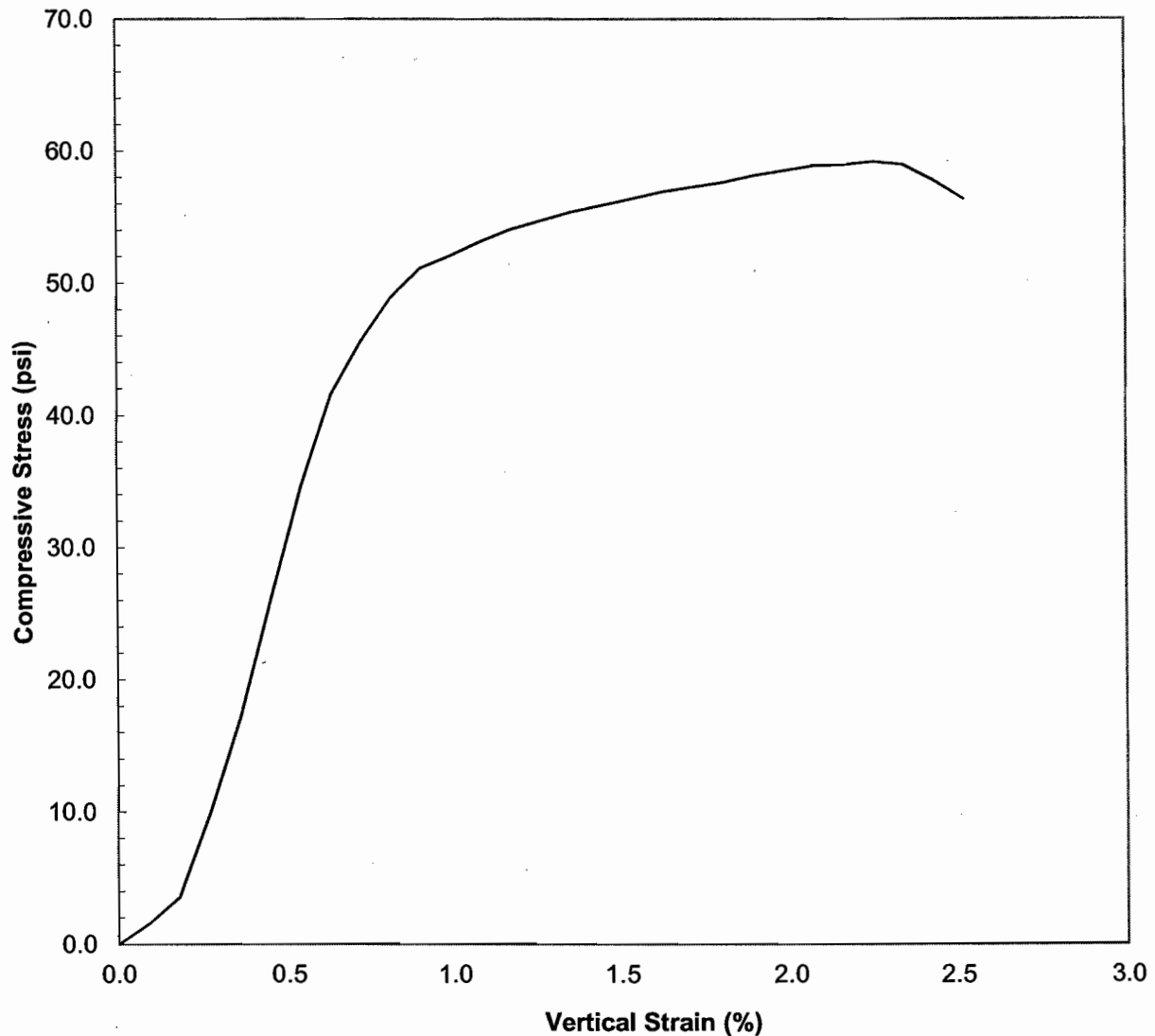
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 17-24**

**Depth: N/A**

**ATL Sample No. AT1573S017**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

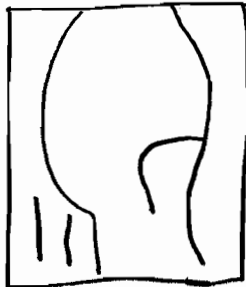
ATL Report No. AT1573SL-18-12-10

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 17-22

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	12/15/2010
Date of Test	12/22/2010
Age of Sample at Test Date	7 Days
Initial Dry Density (pcf)	63.9
Initial Water Content (%)	59.7
Unconfined Compressive Strength (psi)	122.3
Average Height (in.)	5.354
Average Diameter (in.)	2.984
Height-to-Diameter Ratio	1.79
Average Rate of Strain (%/min)	0.50
Strain at Failure (%)	1.8
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 12/26/10



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-18-12-10**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

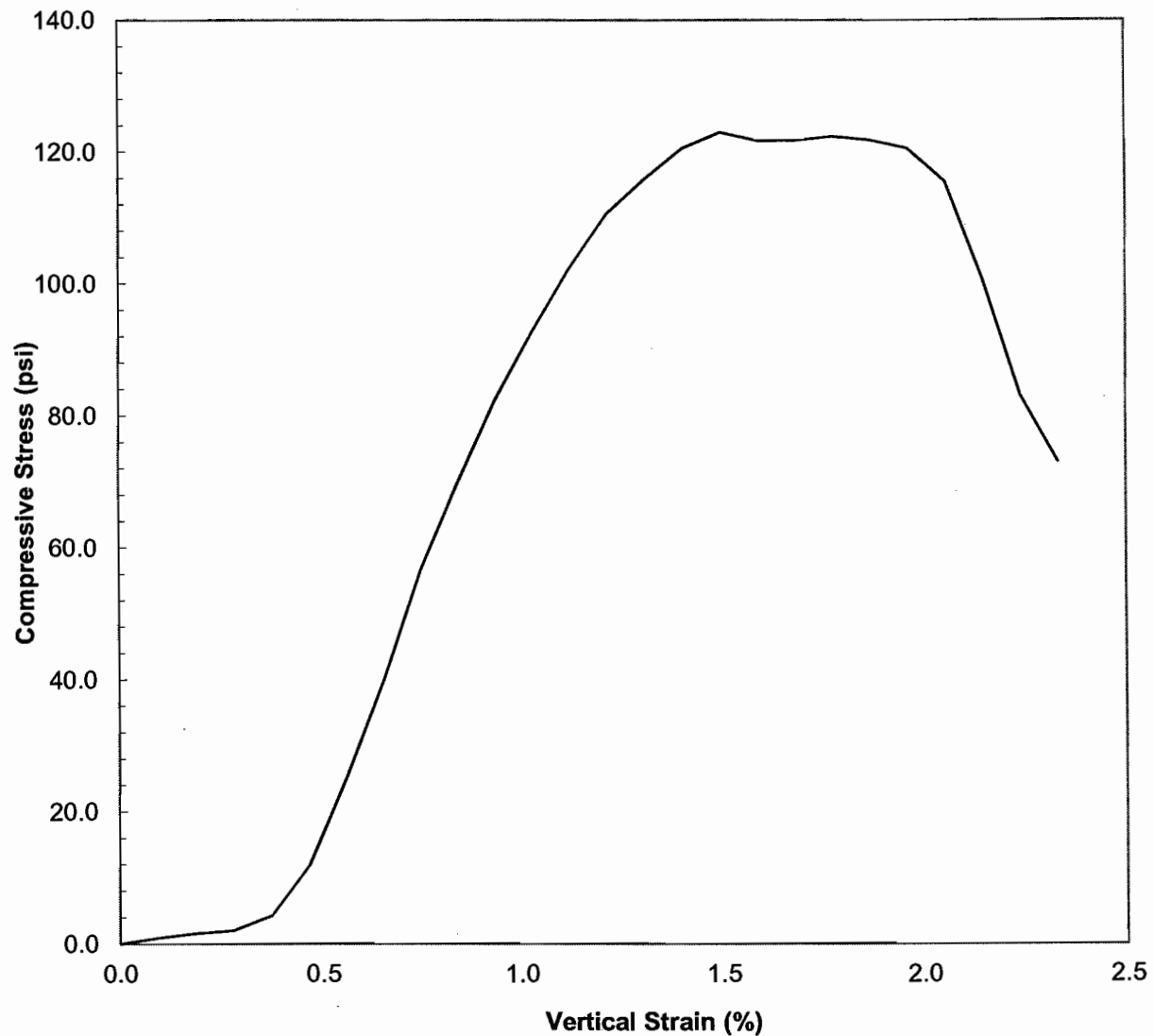
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 17-22**

**Depth: N/A**

**ATL Sample No. AT1573S018**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

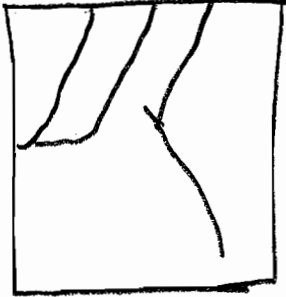
ATL Report No. AT1573SL-19-12-10

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 21-21

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	12/16/2010
Date of Test	12/23/2010
Age of Sample at Test Date	7 Days
Initial Dry Density (pcf)	69.5
Initial Water Content (%)	52.0
Unconfined Compressive Strength (psi)	87.0
Average Height (in.)	5.393
Average Diameter (in.)	2.985
Height-to-Diameter Ratio	1.81
Average Rate of Strain (%/min)	0.67
Strain at Failure (%)	1.9
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 12/26/10



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-19-12-10**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

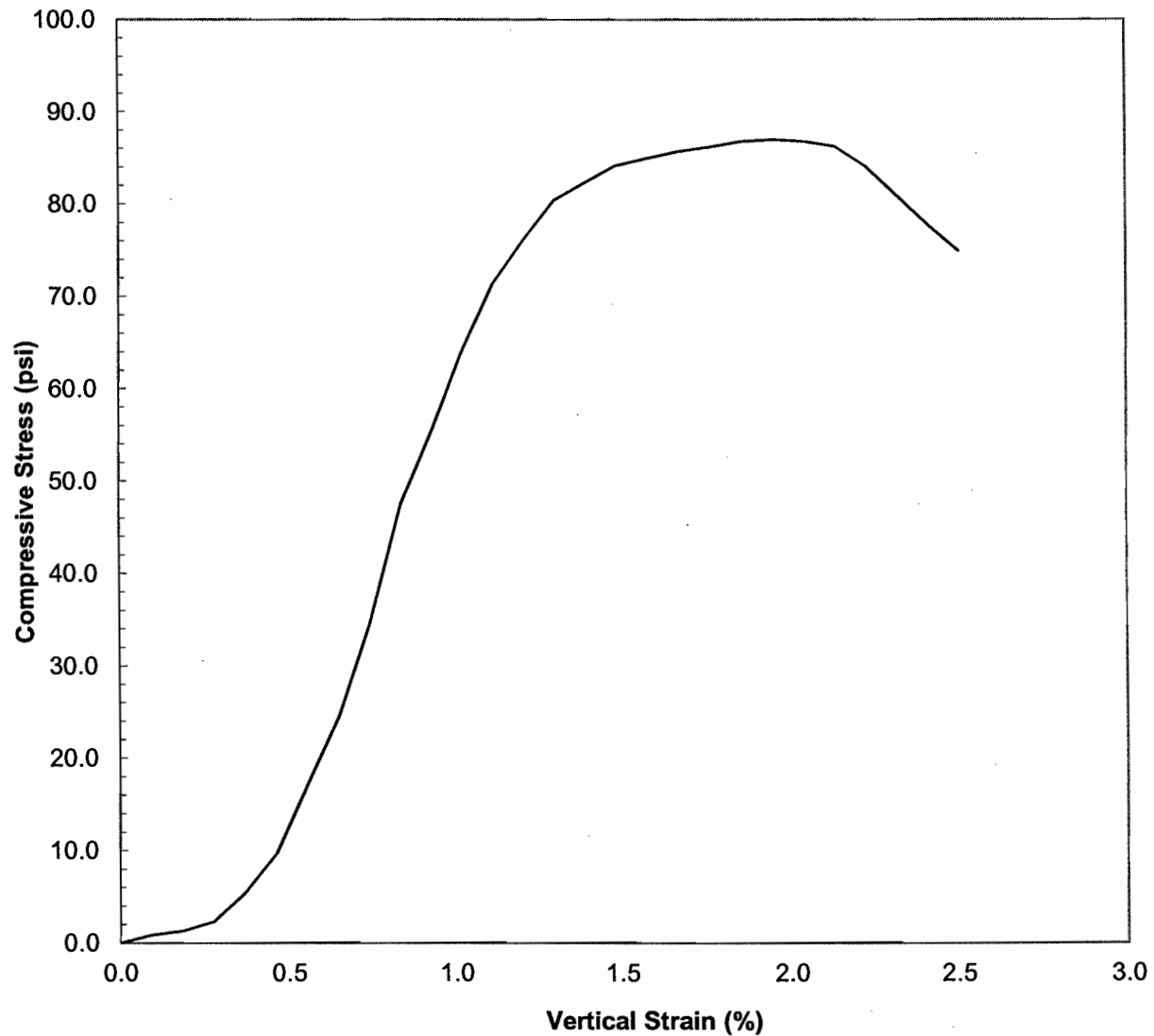
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 21-21**

**Depth: N/A**

**ATL Sample No. AT1573S019**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

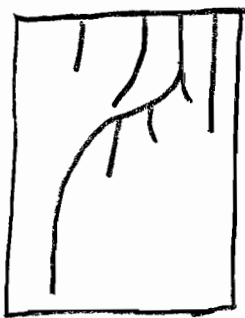
ATL Report No. AT1573SL-20-12-10

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 24-19

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	12/17/2010
Date of Test	12/27/2010
Age of Sample at Test Date	10 Days
Initial Dry Density (pcf)	67.2
Initial Water Content (%)	55.4
Unconfined Compressive Strength (psi)	95.3
Average Height (in.)	5.407
Average Diameter (in.)	2.982
Height-to-Diameter Ratio	1.81
Average Rate of Strain (%/min)	0.68
Strain at Failure (%)	1.7
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: RBF

Date: 12/28/10



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-20-12-10**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

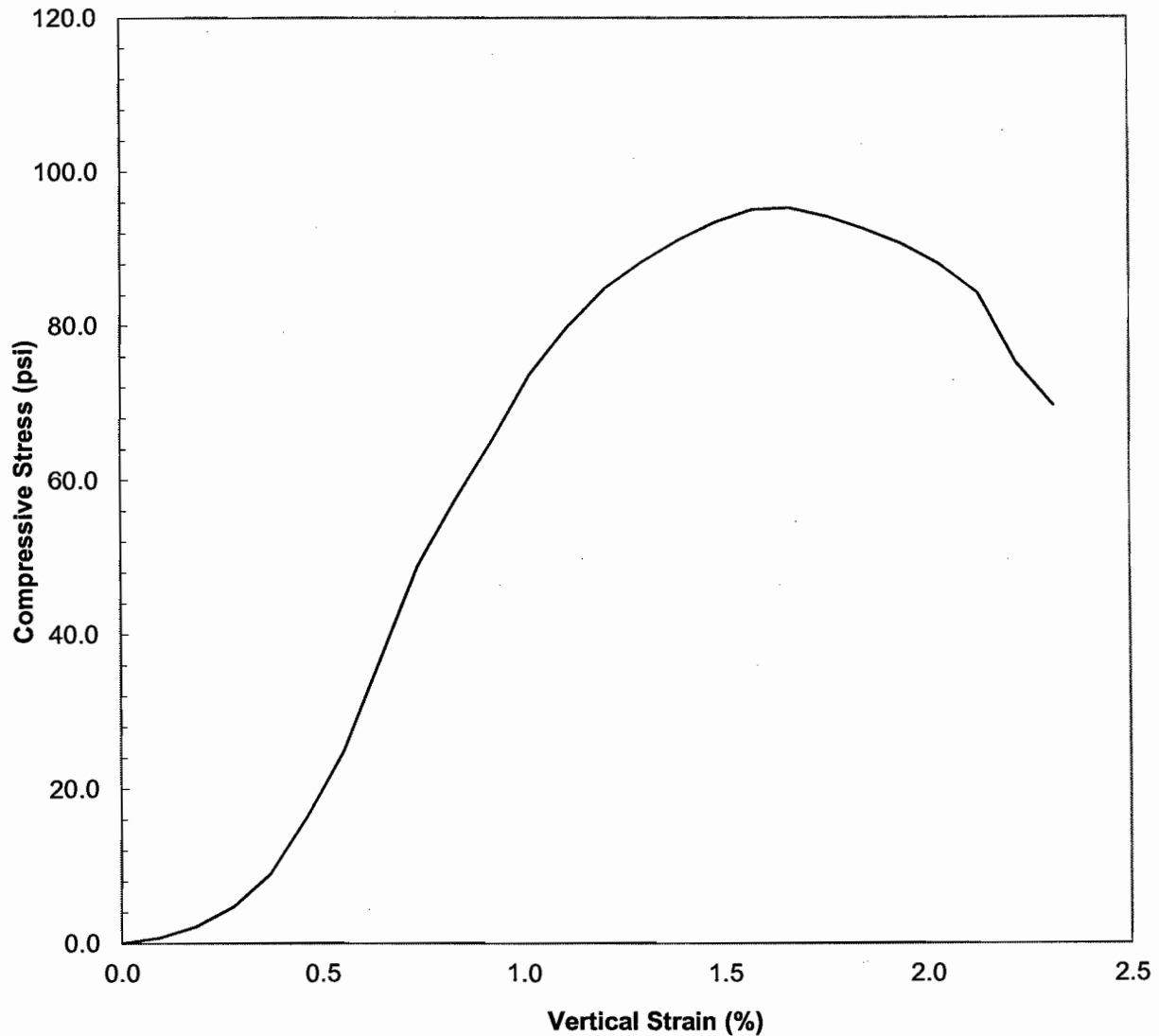
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 24-19**

**Depth: N/A**

**ATL Sample No. AT1573S020**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

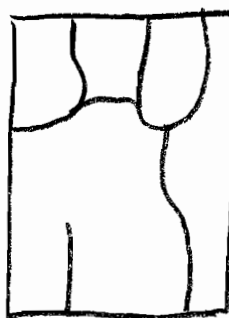
ATL Report No. AT1573SL-21-12-10

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 24-17

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	12/18/2010
Date of Test	12/27/2010
Age of Sample at Test Date	9 Days
Initial Dry Density (pcf)	65.7
Initial Water Content (%)	56.8
Unconfined Compressive Strength (psi)	109.2
Average Height (in.)	5.472
Average Diameter (in.)	2.991
Height-to-Diameter Ratio	1.83
Average Rate of Strain (%/min)	0.68
Strain at Failure (%)	2.0
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 12/28/10





# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-21-12-10**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

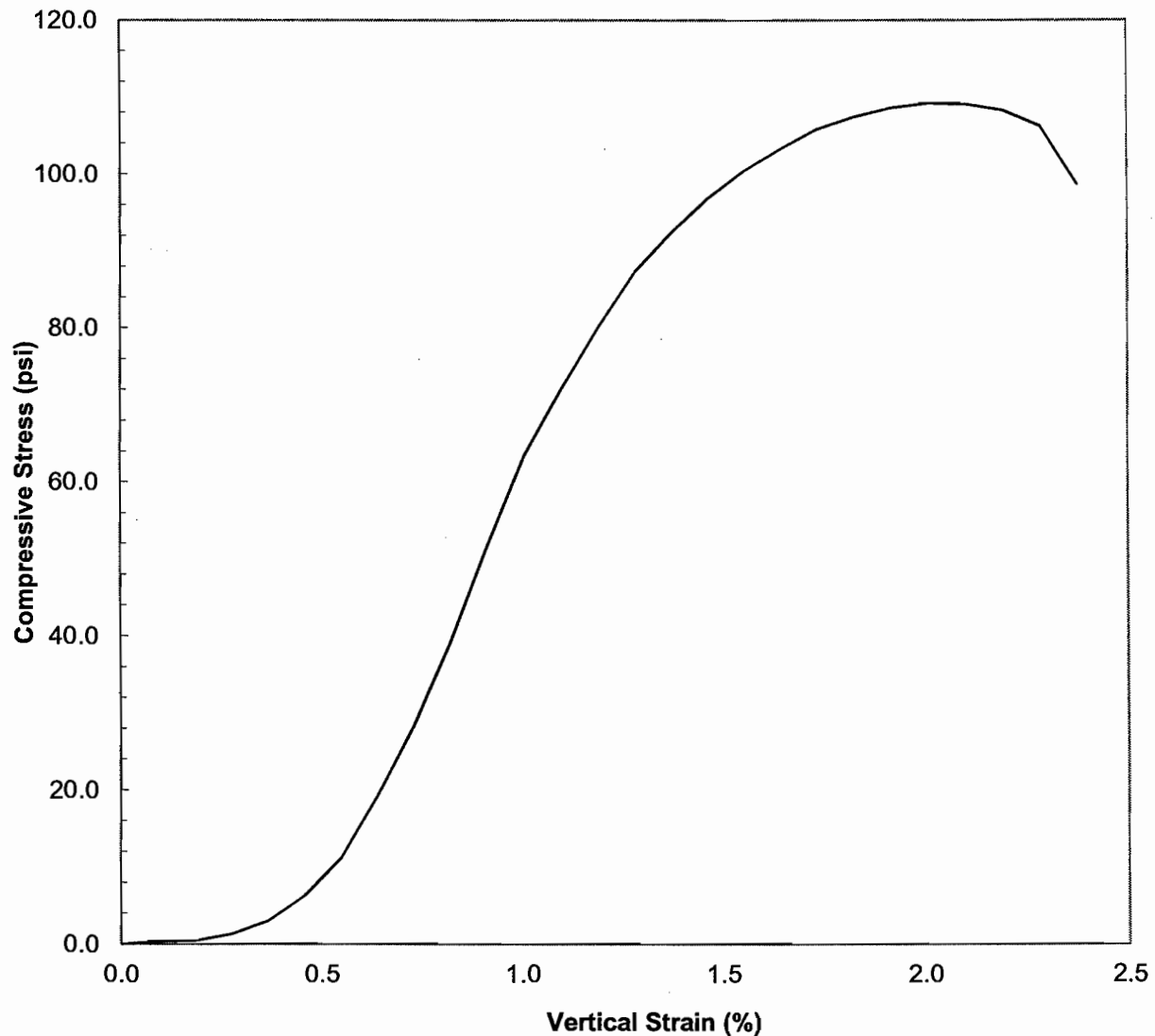
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 24-17**

**Depth: N/A**

**ATL Sample No. AT1573S021**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

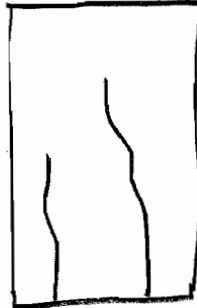
ATL Report No. AT1573SL-22-12-10

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 29-15

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	12/20/2010
Date of Test	1/4/2011
Age of Sample at Test Date	15 Days
Initial Dry Density (pcf)	64.6
Initial Water Content (%)	55.4
Unconfined Compressive Strength (psi)	110
Average Height (in.)	5.472
Average Diameter (in.)	2.992
Height-to-Diameter Ratio	1.83
Average Rate of Strain (%/min)	0.73
Strain at Failure (%)	1.5
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.  
Did not Run 7 day due to holiday

Reviewed by: 

Date: 1/5/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-22-12-10**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

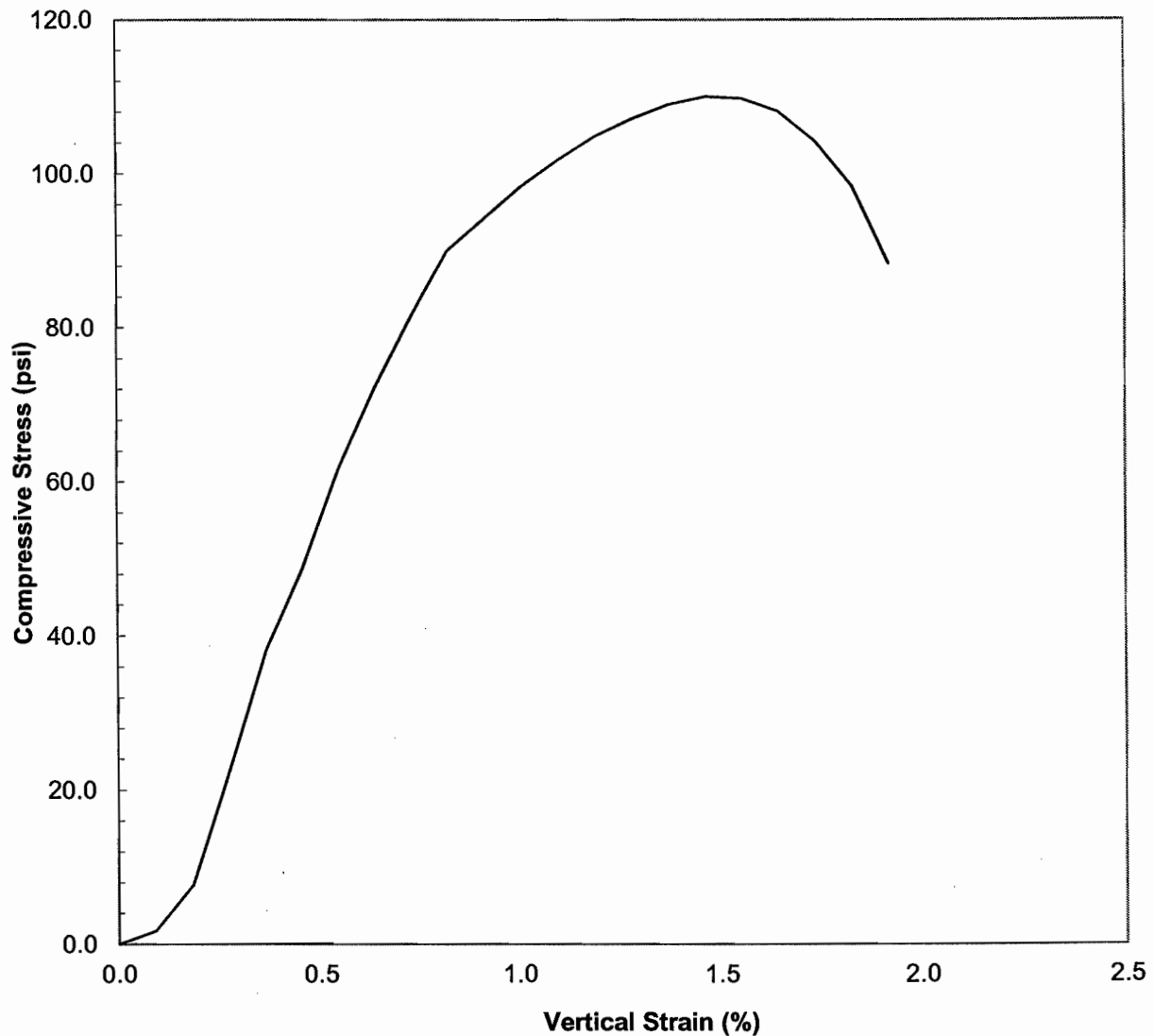
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 29-15, 15 day**

**Depth: N/A**

**ATL Sample No. AT1573S022**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

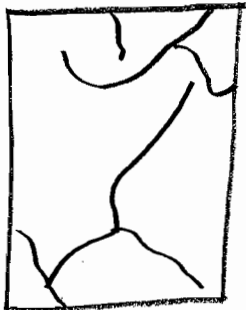
ATL Report No. AT1573SL-23-12-10

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 29-13

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	1/3/2011
Date of Test	1/10/2011
Age of Sample at Test Date	7 Days
Initial Dry Density (pcf)	66.8
Initial Water Content (%)	54.7
Unconfined Compressive Strength (psi)	102.4
Average Height (in.)	5.551
Average Diameter (in.)	2.989
Height-to-Diameter Ratio	1.86
Average Rate of Strain (%/min)	0.70
Strain at Failure (%)	1.9
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 1/11/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-23-12-10**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

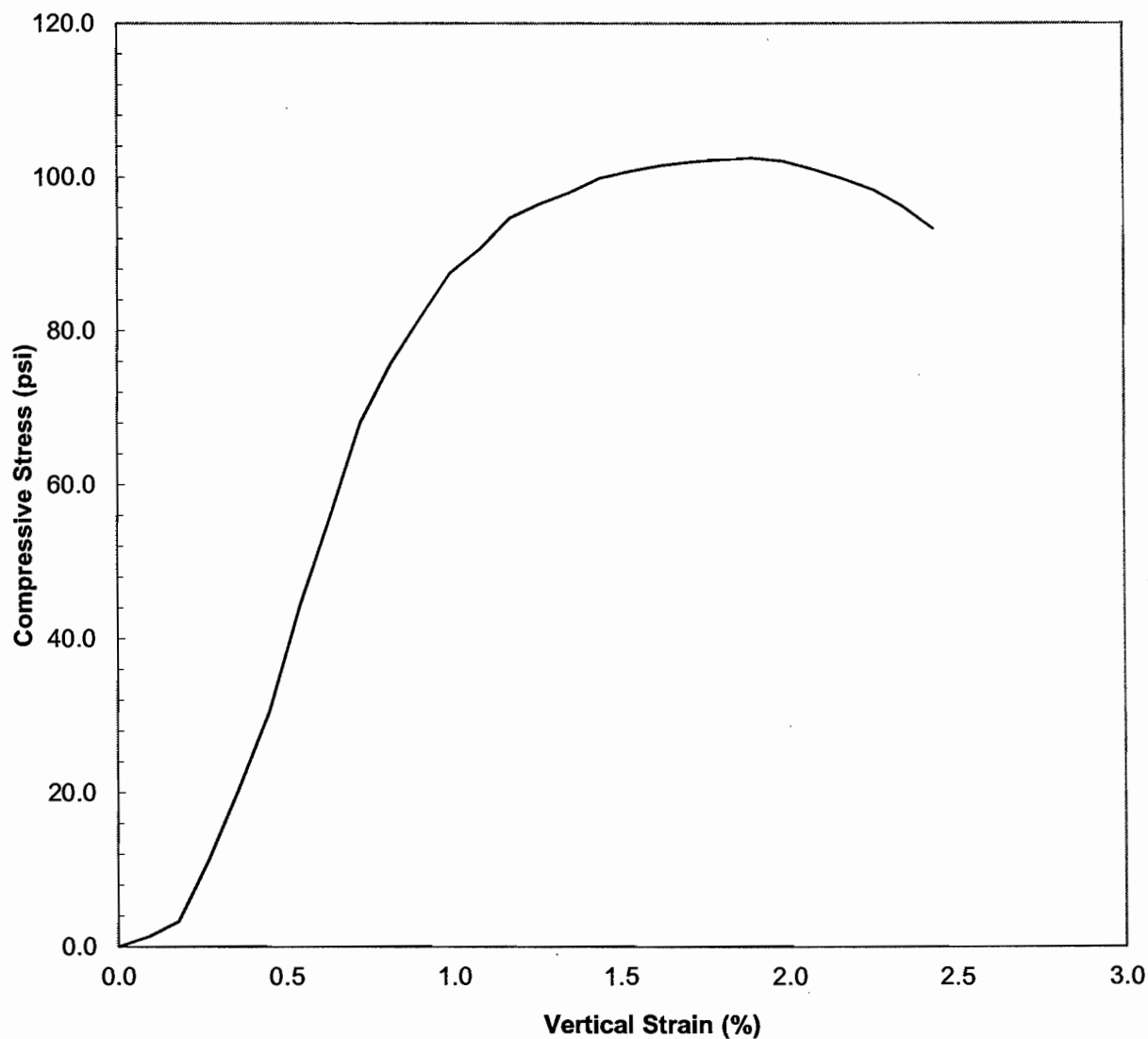
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 29-13, 7 day**

**Depth: N/A**

**ATL Sample No. AT1573S023**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

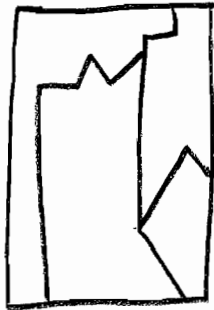
ATL Report No. AT1573SL-24-12-10

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 32-11

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	1/4/2011
Date of Test	1/11/2011
Age of Sample at Test Date	7 Days
Initial Dry Density (pcf)	77.7
Initial Water Content (%)	42.7
Unconfined Compressive Strength (psi)	213.9
Average Height (in.)	5.669
Average Diameter (in.)	2.980
Height-to-Diameter Ratio	1.90
Average Rate of Strain (%/min)	0.69
Strain at Failure (%)	1.5
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 1/12/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-24-12-10**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

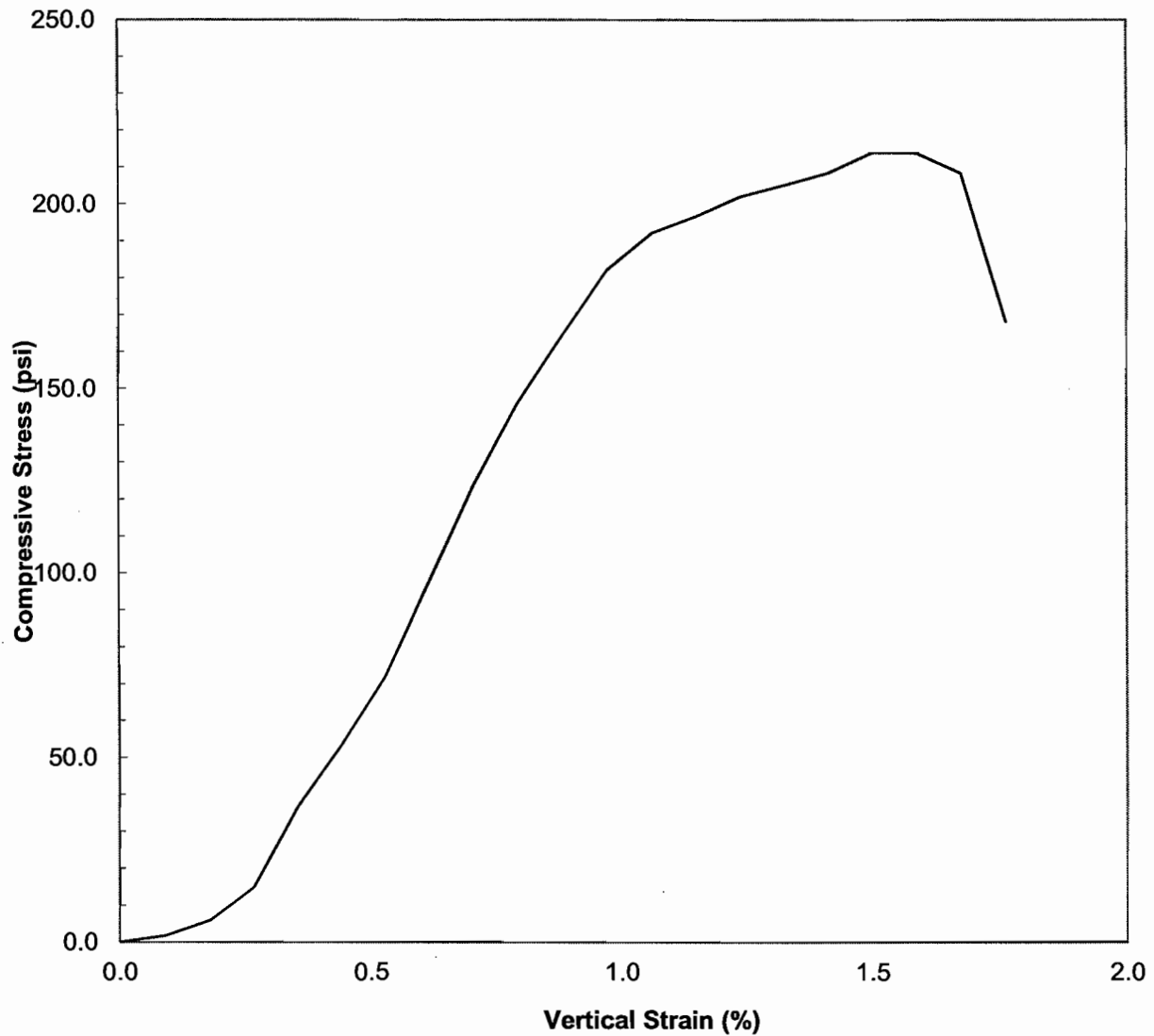
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 32-11, 7 day**

**Depth: N/A**

**ATL Sample No. AT1573S024**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

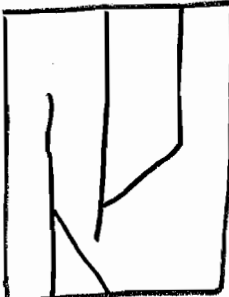
ATL Report No. AT1573SL-25-1-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 37-9

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	1/5/2011
Date of Test	1/12/2011
Age of Sample at Test Date	7 Days
Initial Dry Density (pcf)	72.9
Initial Water Content (%)	47.1
Unconfined Compressive Strength (psi)	252.4
Average Height (in.)	5.472
Average Diameter (in.)	3.004
Height-to-Diameter Ratio	1.82
Average Rate of Strain (%/min)	0.71
Strain at Failure (%)	1.7
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 1/13/11





# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-25-1-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

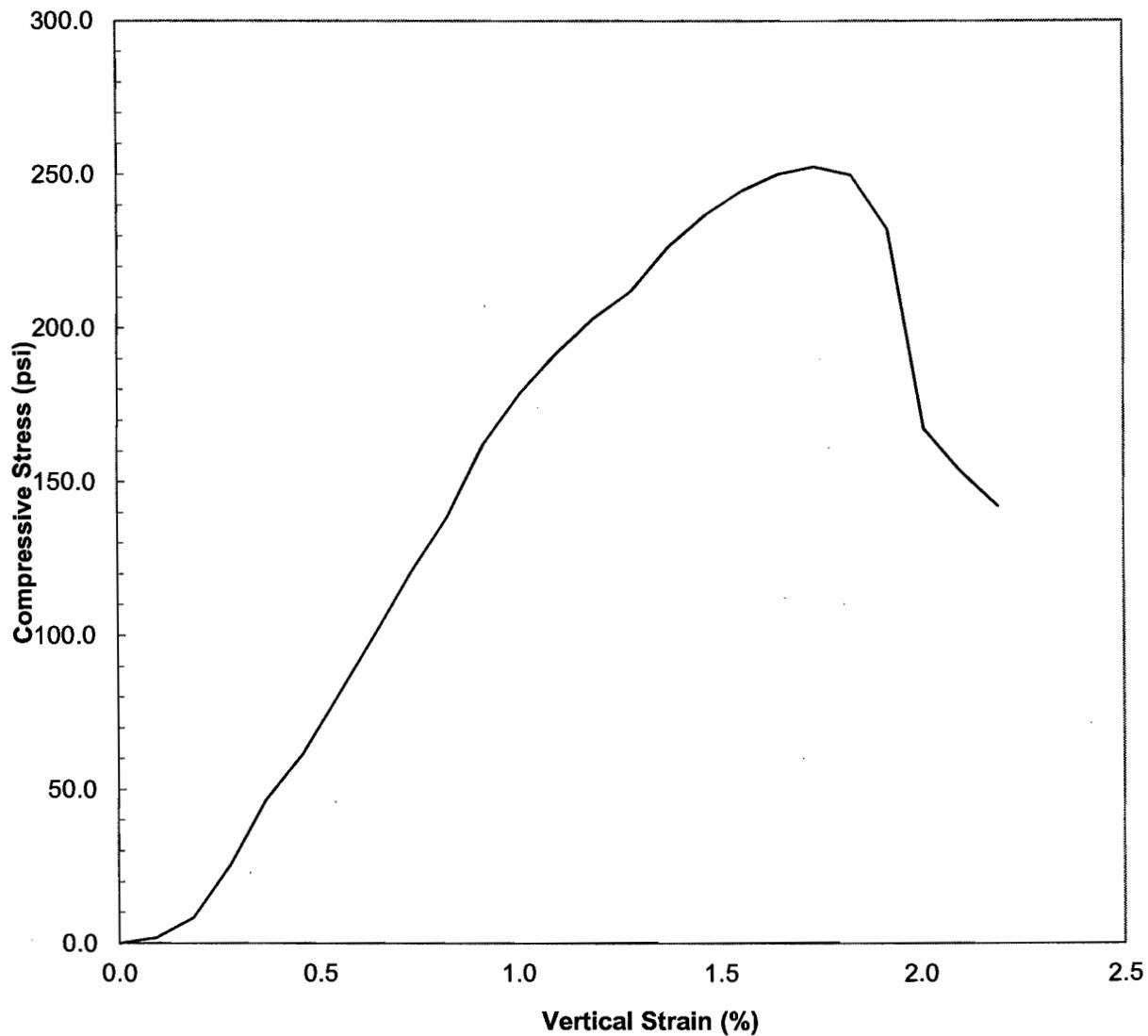
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 37-9, 7 day**

**Depth: N/A**

**ATL Sample No. AT1573S025**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

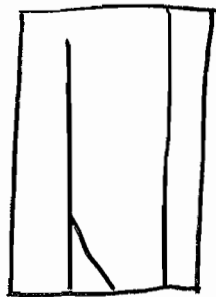
ATL Report No. AT1573SL-26-1-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 41-9

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	1/6/2011
Date of Test	1/13/2011
Age of Sample at Test Date	7 Days
Initial Dry Density (pcf)	76.8
Initial Water Content (%)	44.7
Unconfined Compressive Strength (psi)	253.1
Average Height (in.)	5.551
Average Diameter (in.)	2.996
Height-to-Diameter Ratio	1.85
Average Rate of Strain (%/min)	0.68
Strain at Failure (%)	1.7
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 1/14/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-26-1-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

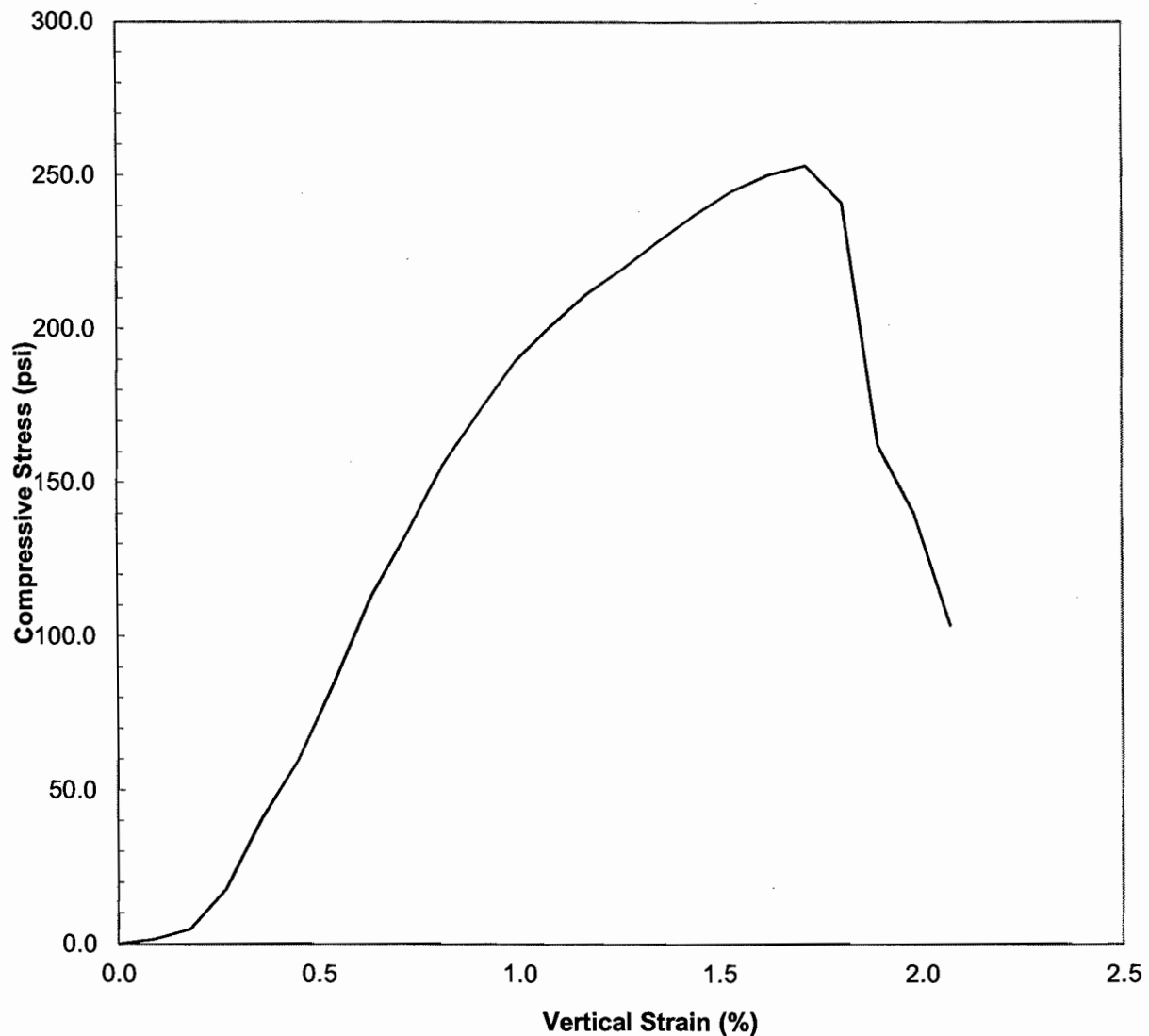
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 41-9, 7 day**

**Depth: N/A**

**ATL Sample No. AT1573S026**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166


ATL Report No. AT1573SL-27-1-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 45-9

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	1/7/2011
Date of Test	1/14/2011
Age of Sample at Test Date	7 Days
Initial Dry Density (pcf)	72.4
Initial Water Content (%)	48.1
Unconfined Compressive Strength (psi)	176.3
Average Height (in.)	5.472
Average Diameter (in.)	3.000
Height-to-Diameter Ratio	1.82
Average Rate of Strain (%/min)	0.69
Strain at Failure (%)	1.5
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 1/17/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-27-1-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

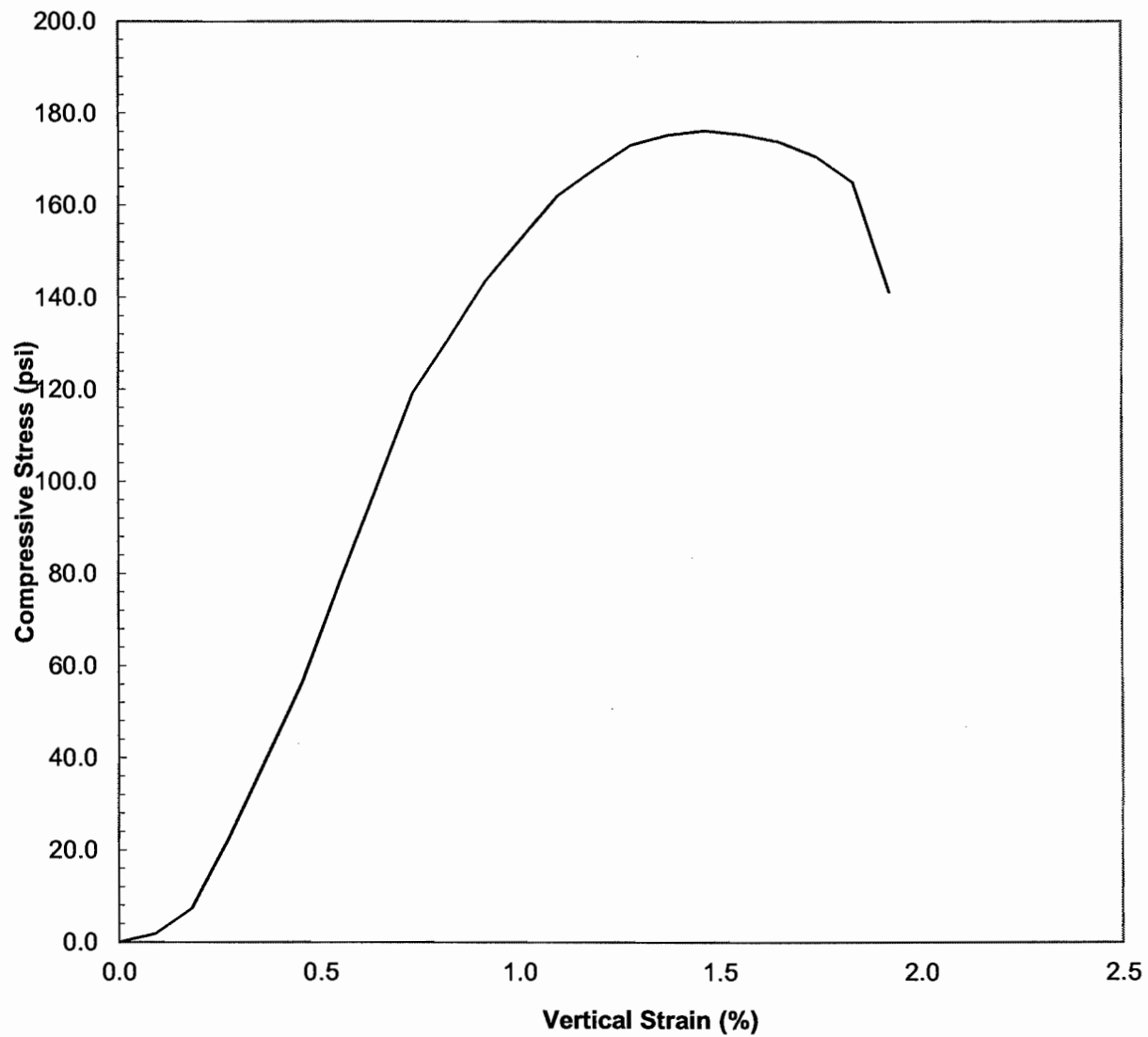
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 45-9, 7 day**

**Depth: N/A**

**ATL Sample No. AT1573S027**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

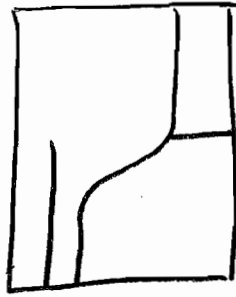
ATL Report No. AT1573SL-28-1-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 49-9

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	1/7/2011
Date of Test	1/14/2011
Age of Sample at Test Date	7 Days
Initial Dry Density (pcf)	74.4
Initial Water Content (%)	46.2
Unconfined Compressive Strength (psi)	252.3
Average Height (in.)	5.433
Average Diameter (in.)	3.000
Height-to-Diameter Ratio	1.81
Average Rate of Strain (%/min)	0.68
Strain at Failure (%)	1.5
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 1/17/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-28-1-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

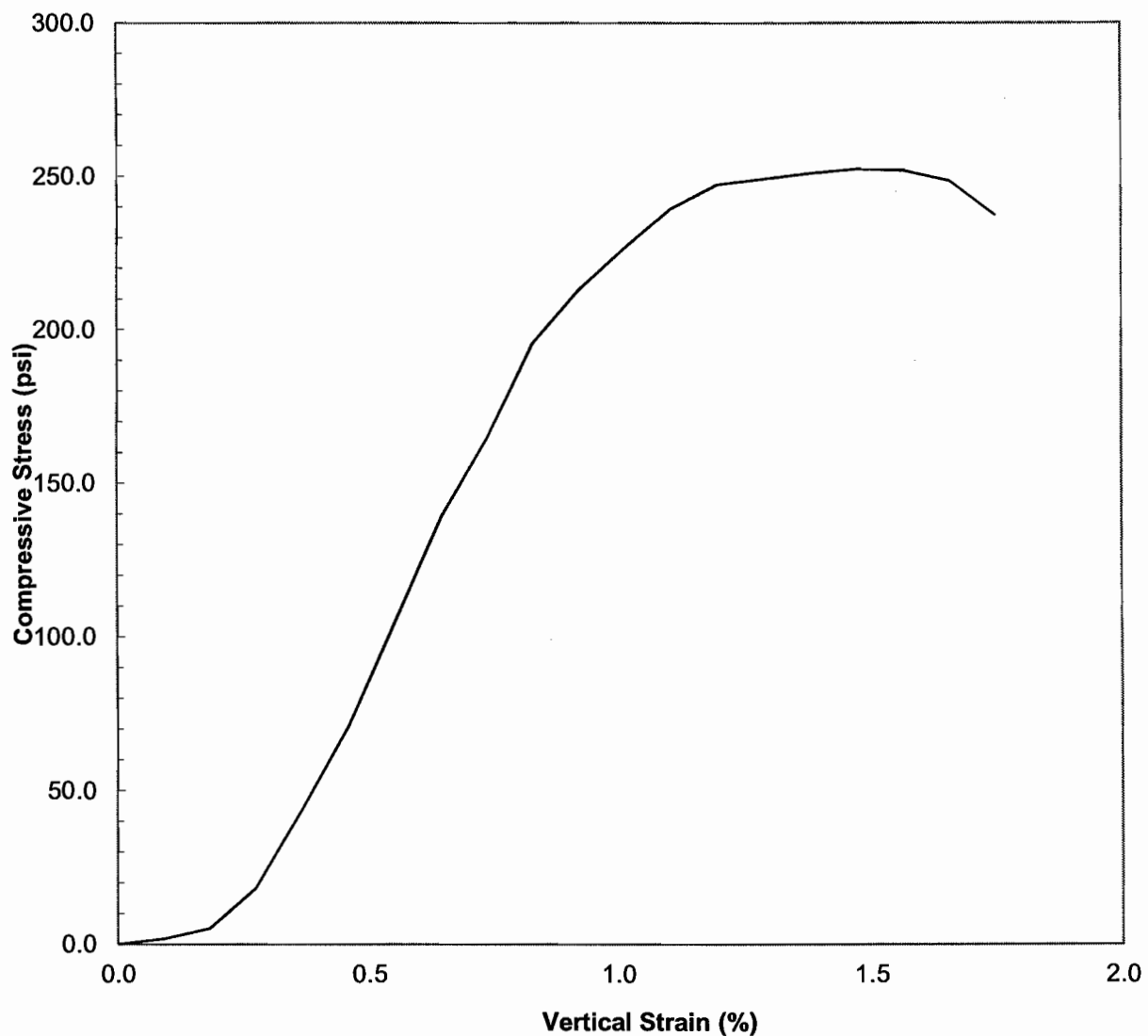
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 49-9, 7 day**

**Depth: N/A**

**ATL Sample No. AT1573S028**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

ATL Report No. AT1573SL-29-1-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 49-5

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	1/8/2011
Date of Test	1/17/2011
Age of Sample at Test Date	9 Days
Initial Dry Density (pcf)	75.4
Initial Water Content (%)	45.1
Unconfined Compressive Strength (psi)	260.9
Average Height (in.)	5.551
Average Diameter (in.)	2.999
Height-to-Diameter Ratio	1.85
Average Rate of Strain (%/min)	0.68
Strain at Failure (%)	1.7
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by:

Date: 1/18/11





# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-29-1-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

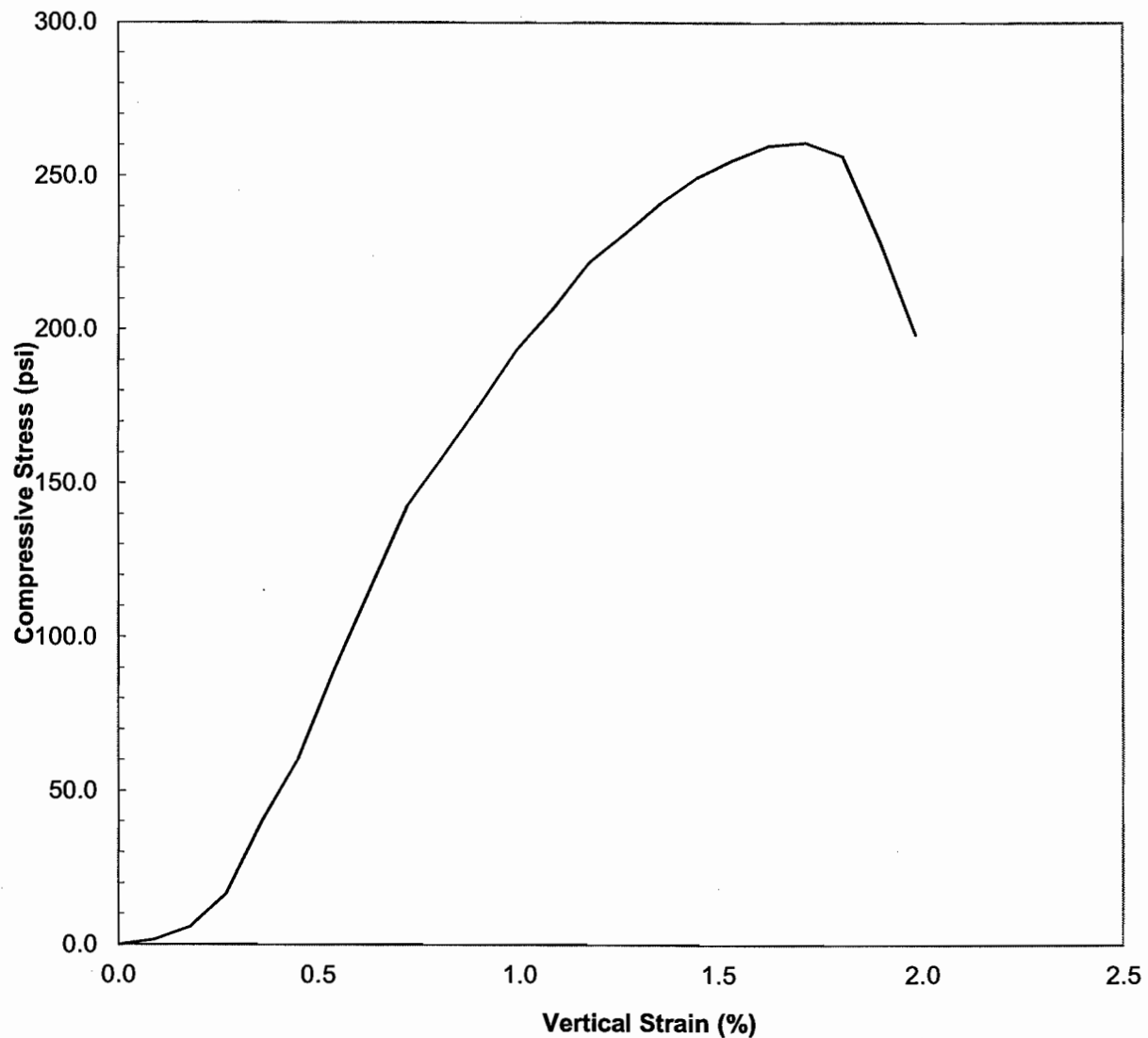
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 49-5, 9 day**

**Depth: N/A**

**ATL Sample No. AT1573S029**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

ATL Report No. AT1573SL-30-1-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 48-3

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	1/10/2011
Date of Test	1/17/2011
Age of Sample at Test Date	7 Days
Initial Dry Density (pcf)	77.1
Initial Water Content (%)	43.3
Unconfined Compressive Strength (psi)	125.6
Average Height (in.)	5.591
Average Diameter (in.)	2.995
Height-to-Diameter Ratio	1.87
Average Rate of Strain (%/min)	0.68
Strain at Failure (%)	1.3
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by:

Date: 1/18/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-30-1-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

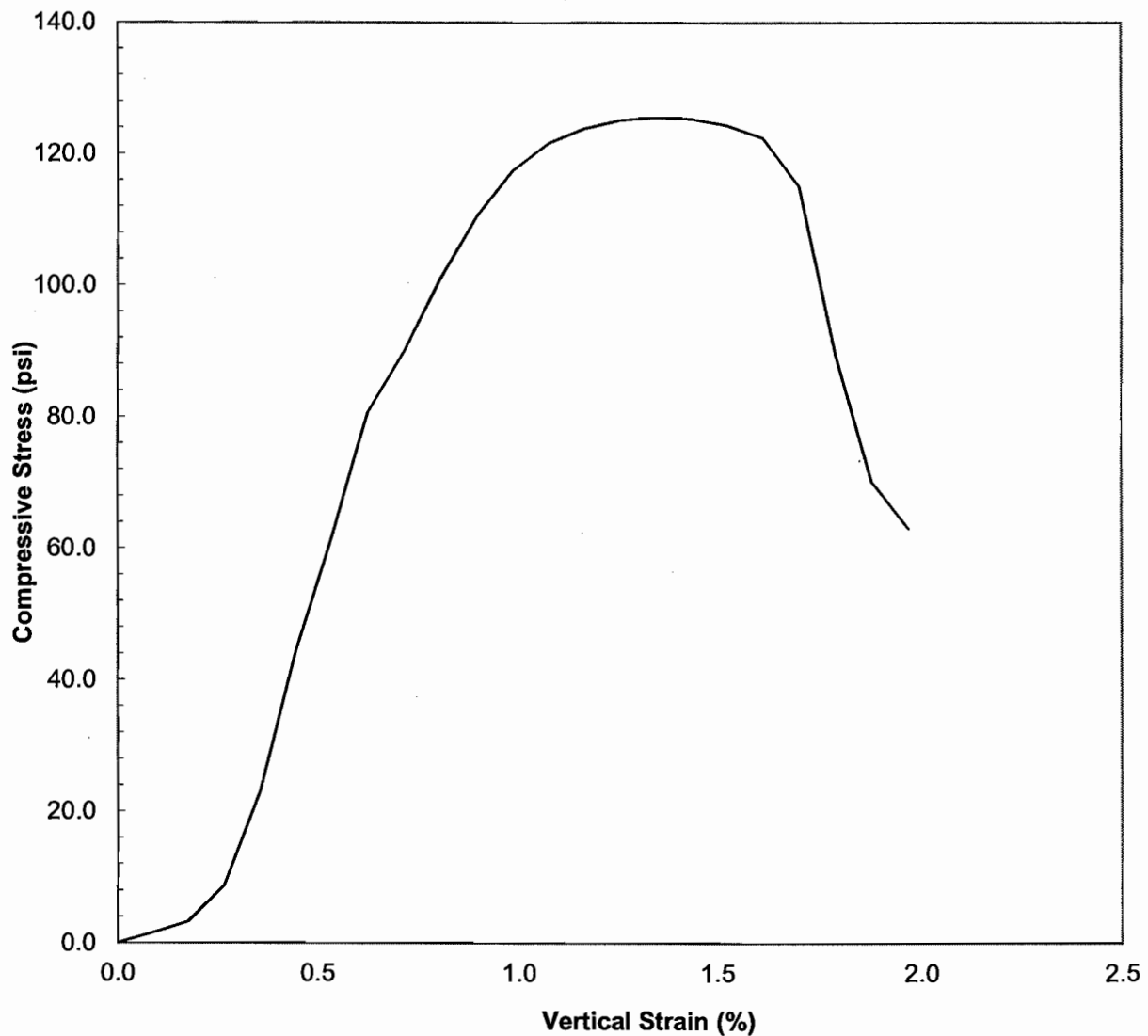
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 48-3, 7 day**

**Depth: N/A**

**ATL Sample No. AT1573S030**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166


ATL Report No. AT1573SL-31-1-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 47-5

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	1/11/2011
Date of Test	1/18/2011
Age of Sample at Test Date	7 Days
Initial Dry Density (pcf)	79.0
Initial Water Content (%)	41.7
Unconfined Compressive Strength (psi)	207.8
Average Height (in.)	5.591
Average Diameter (in.)	2.993
Height-to-Diameter Ratio	1.87
Average Rate of Strain (%/min)	0.68
Strain at Failure (%)	1.3
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 1/19/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-31-1-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

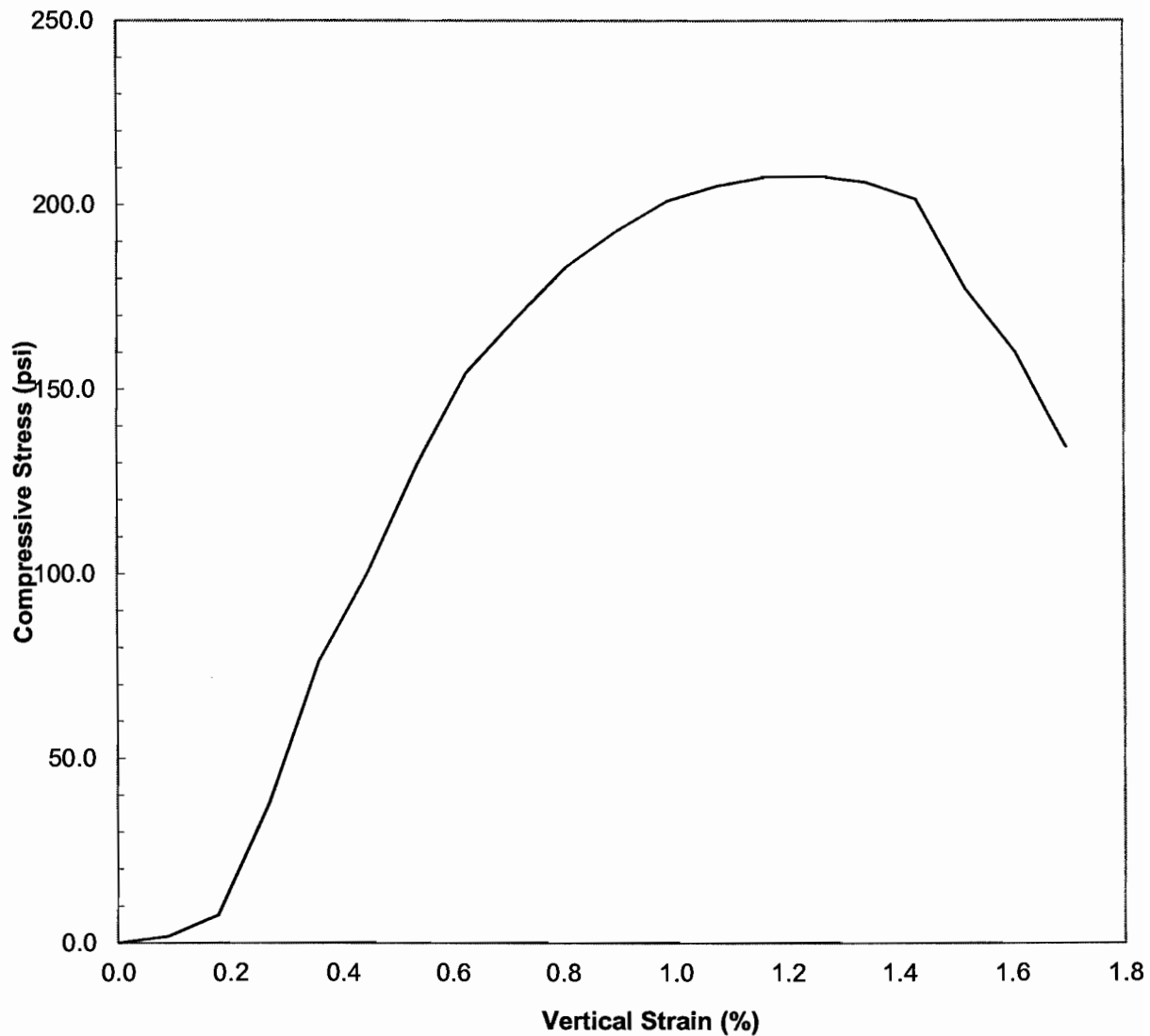
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 47-5, 7 day**

**Depth: N/A**

**ATL Sample No. AT1573S031**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

ATL Report No. AT1573SL-32-1-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 46-6

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	1/12/2011
Date of Test	1/19/2011
Age of Sample at Test Date	7 Days
Initial Dry Density (pcf)	76.1
Initial Water Content (%)	43.3
Unconfined Compressive Strength (psi)	197.3
Average Height (in.)	5.709
Average Diameter (in.)	3.001
Height-to-Diameter Ratio	1.90
Average Rate of Strain (%/min)	0.65
Strain at Failure (%)	1.3
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 1/20/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-32-1-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

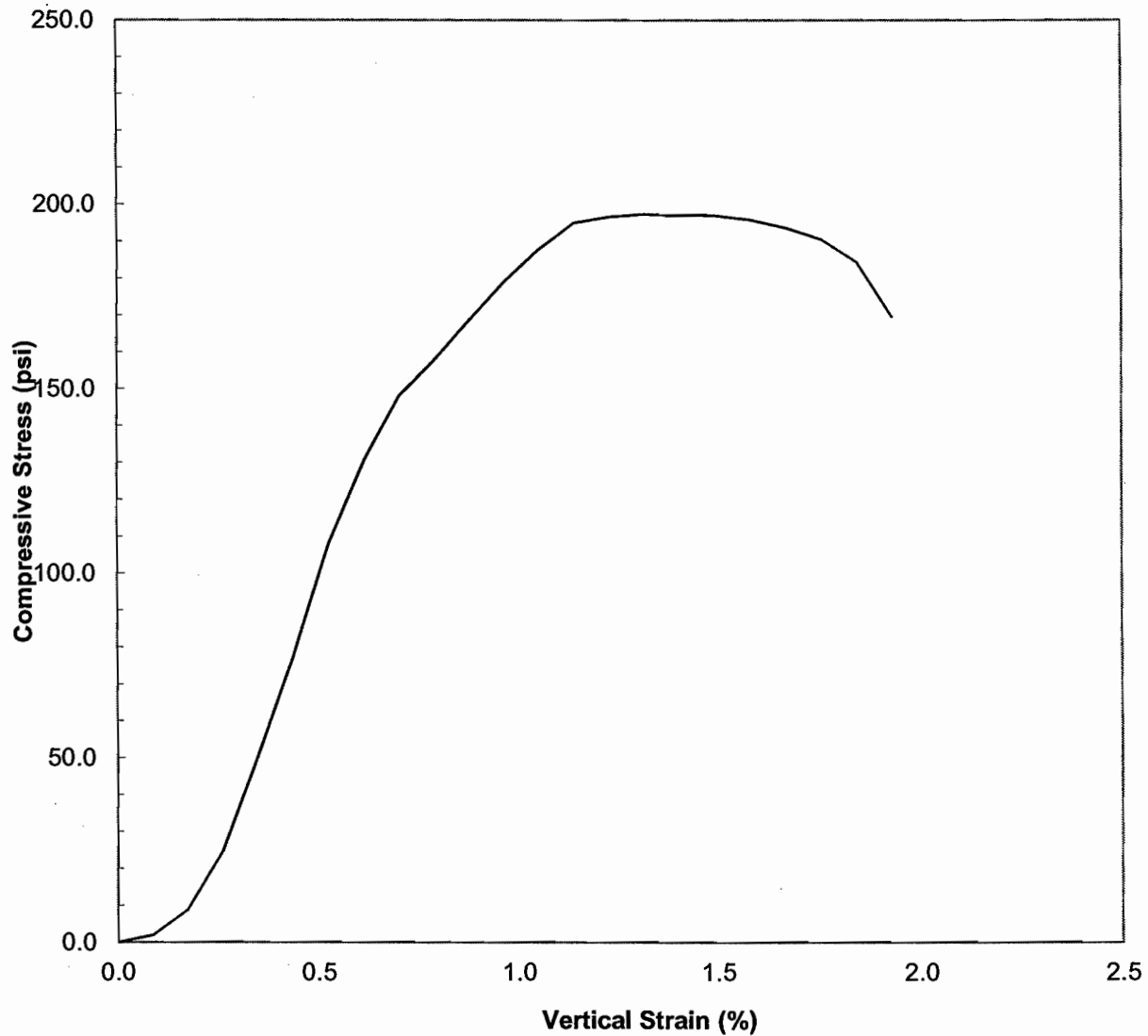
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 46-6, 7 day**

**Depth: N/A**

**ATL Sample No. AT1573S032**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

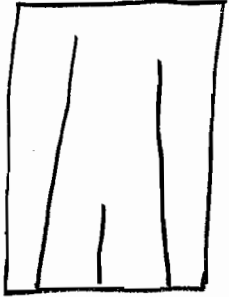
ATL Report No. AT1573SL-33-1-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 44-4

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	1/13/2011
Date of Test	1/20/2011
Age of Sample at Test Date	7 Days
Initial Dry Density (pcf)	73.3
Initial Water Content (%)	46.5
Unconfined Compressive Strength (psi)	205.7
Average Height (in.)	5.551
Average Diameter (in.)	3.001
Height-to-Diameter Ratio	1.85
Average Rate of Strain (%/min)	0.67
Strain at Failure (%)	1.3
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 1/21/11





# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-33-1-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

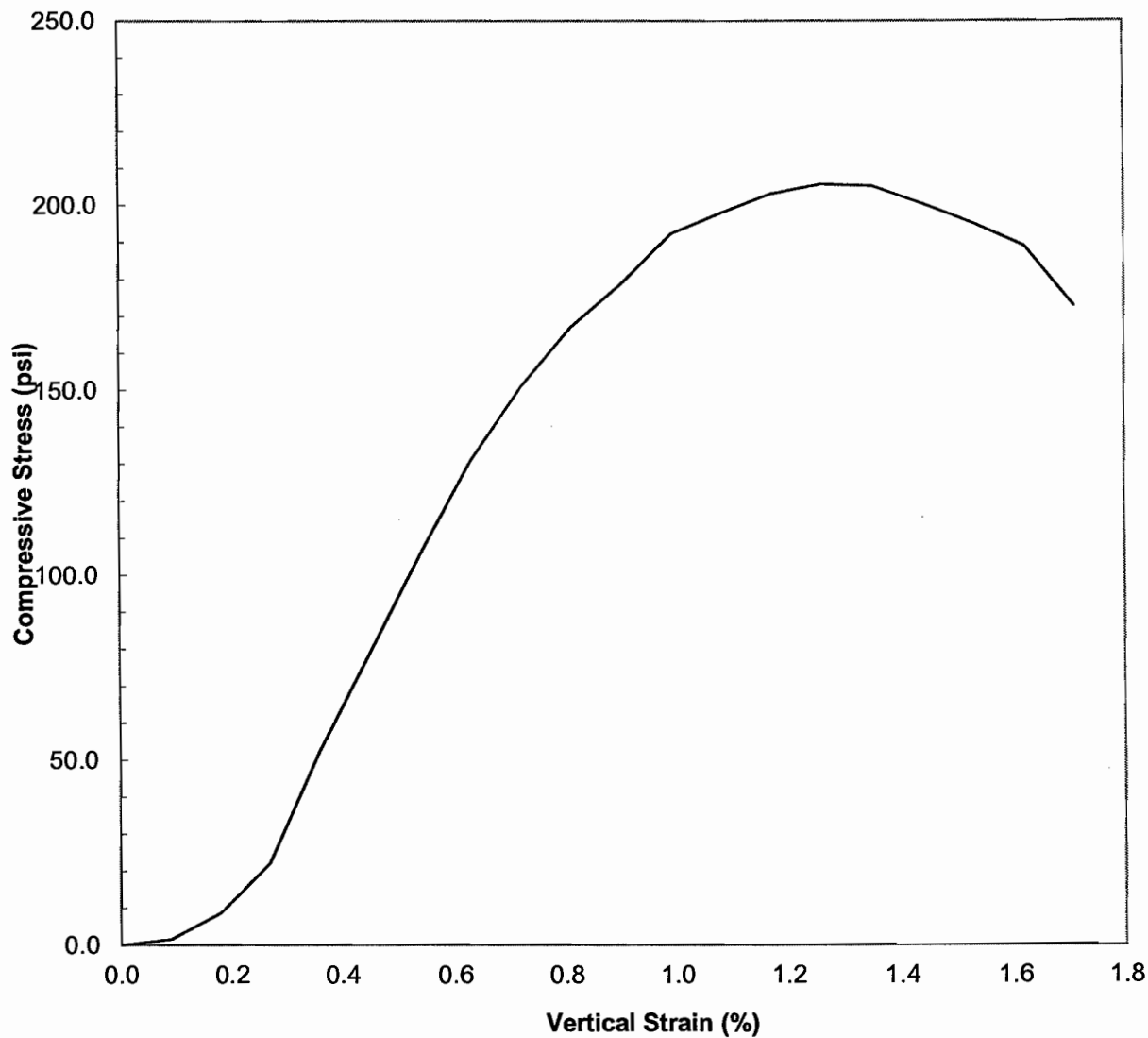
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 44-4, 7 day**

**Depth: N/A**

**ATL Sample No. AT1573S033**





# ATLANTIC TESTING LABORATORIES

**Albany**  
22 Corporate Drive  
Clifton Park, NY 12065  
518-383-9144 (T)  
518-383-9166 (F)

## TRANSMITTAL

January 24, 2011

AECOM  
40 British American Boulevard  
Latham, New York 12110

Attn: Mr. Scott Serviss

E/Mail: [scott.serviss@aecom.com](mailto:scott.serviss@aecom.com)

Re: Soil Laboratory Testing  
NGP Site  
Norwich, New York  
ATL Project No.: AT1573

Dear Mr. Serviss:

Enclosed are the following reports:

AT1573SL-34-1-11	Unconfined Compressive Strength	January 19, 2011
AT1573SL-35-1-11	Unconfined Compressive Strength	January 19, 2011
AT1573SL-27B-1-11	Unconfined Compressive Strength	January 11, 2011
AT1573SL-28B-1-11	Unconfined Compressive Strength	January 11, 2011

Please contact our office should you have any questions or if we may be of further service.

Sincerely,  
ATLANTIC TESTING LABORATORIES, Limited

Robert E. Field  
Laboratory Manager  
[bfield@atlantictesting.com](mailto:bfield@atlantictesting.com)

REF/nd

Enclosures



# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

ATL Report No. AT1573SL-34-1-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 43-4

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	1/14/2011
Date of Test	1/21/2011
Age of Sample at Test Date	7 Days
Initial Dry Density (pcf)	77.3
Initial Water Content (%)	42.4
Unconfined Compressive Strength (psi)	260.0
Average Height (in.)	5.512
Average Diameter (in.)	3.000
Height-to-Diameter Ratio	1.84
Average Rate of Strain (%/min)	0.67
Strain at Failure (%)	1.5
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: REF

Date: 1/24/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-34-1-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

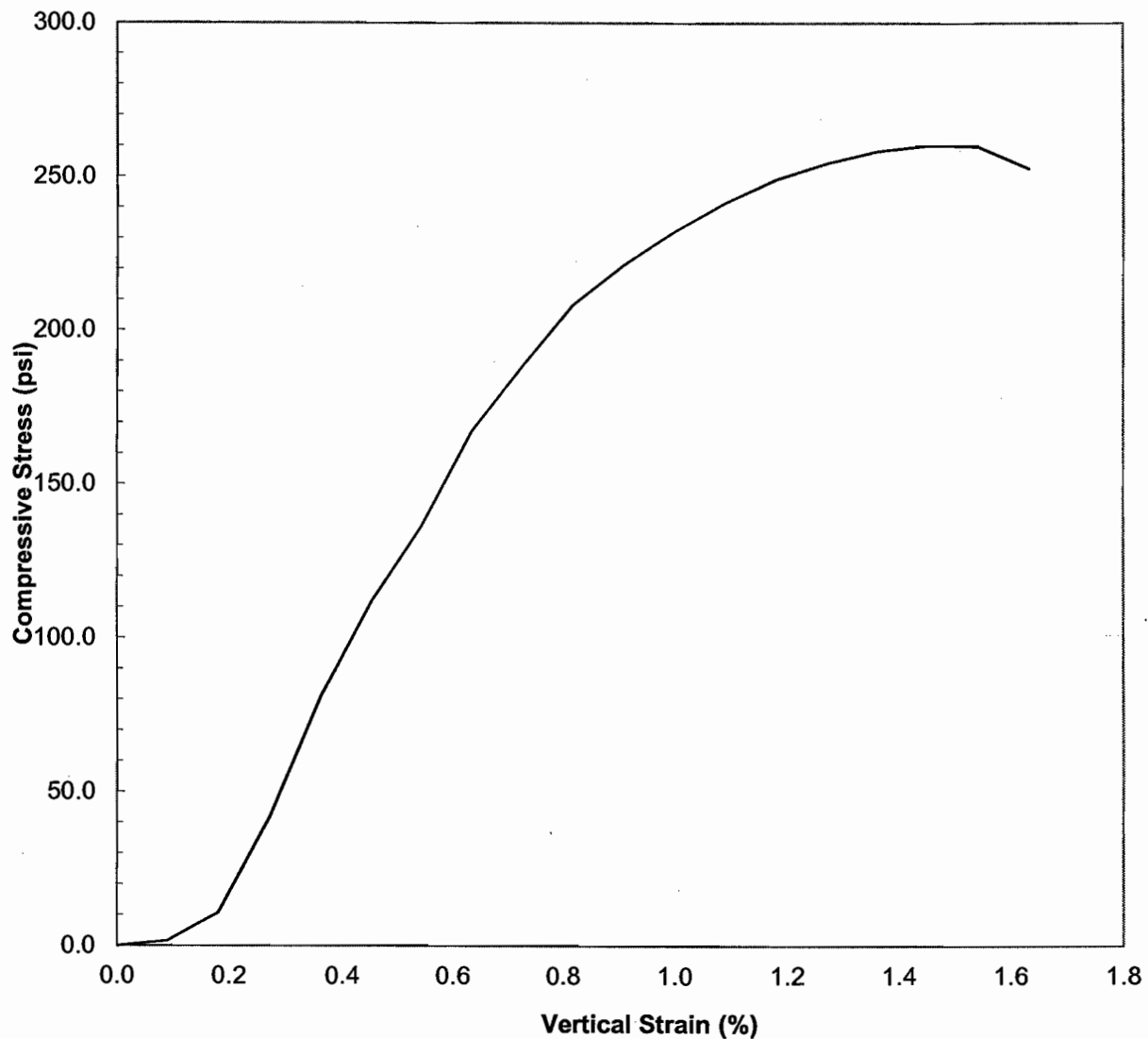
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 43-4, 7 day**

**Depth: N/A**

**ATL Sample No. AT1573S034**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

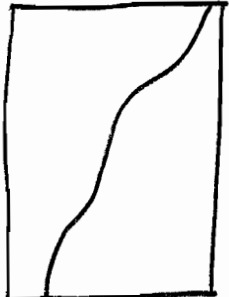
ATL Report No. AT1573SL-35-1-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 42-2

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	1/14/2011
Date of Test	1/21/2011
Age of Sample at Test Date	7 Days
Initial Dry Density (pcf)	74.8
Initial Water Content (%)	45.4
Unconfined Compressive Strength (psi)	181.4
Average Height (in.)	5.512
Average Diameter (in.)	3.001
Height-to-Diameter Ratio	1.84
Average Rate of Strain (%/min)	0.67
Strain at Failure (%)	1.3
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 1/24/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-35-1-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

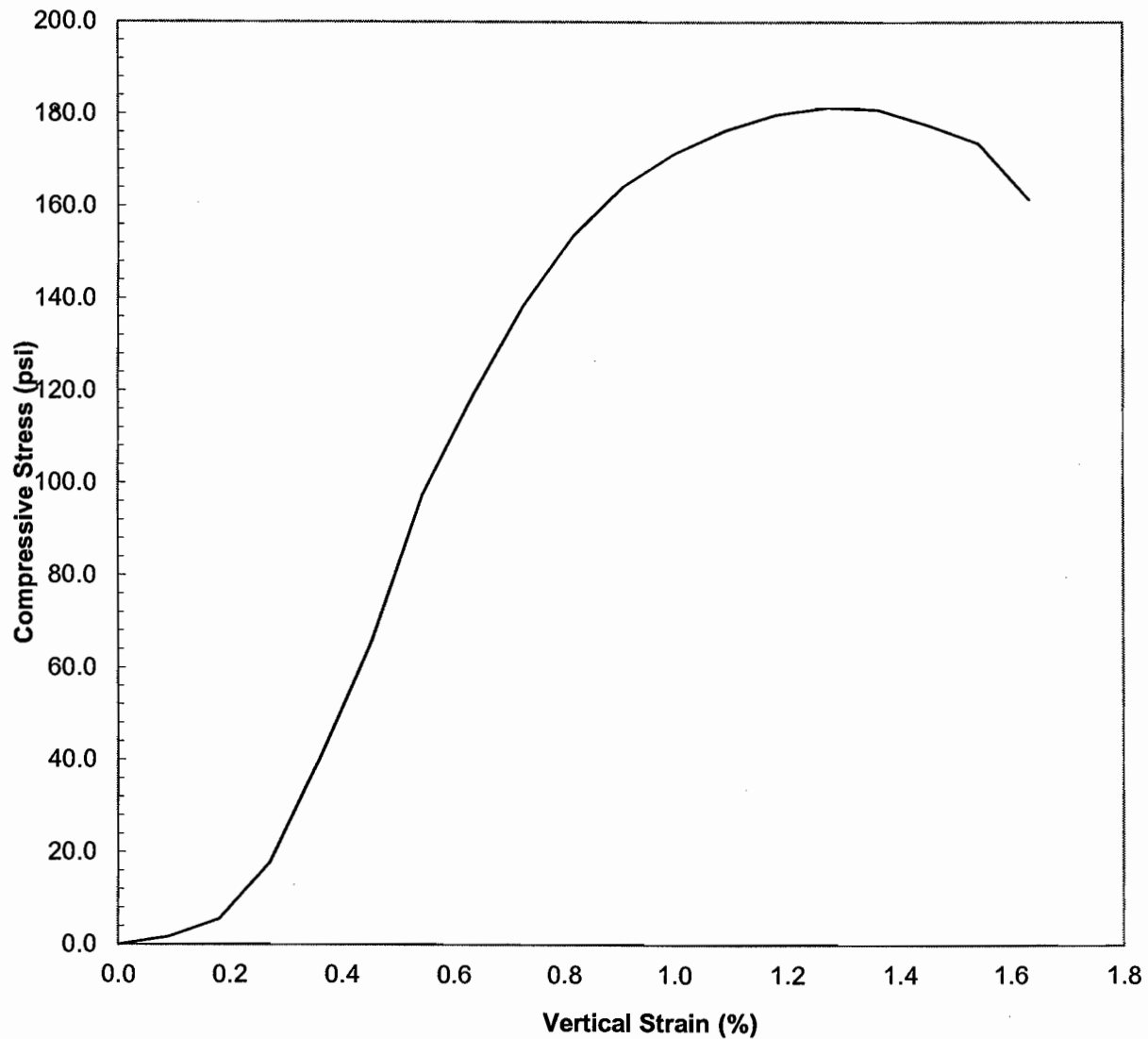
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 42-2, 7 day**

**Depth: N/A**

**ATL Sample No. AT1573S035**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

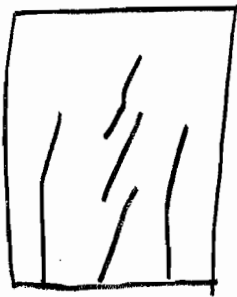
ATL Report No. AT1573SL-36-1-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 37-1

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	1/15/2011
Date of Test	1/24/2011
Age of Sample at Test Date	9 Days
Initial Dry Density (pcf)	79.4
Initial Water Content (%)	40.3
Unconfined Compressive Strength (psi)	155.7
Average Height (in.)	5.551
Average Diameter (in.)	3.004
Height-to-Diameter Ratio	1.85
Average Rate of Strain (%/min)	0.67
Strain at Failure (%)	1.3
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 1/25/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-36-1-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

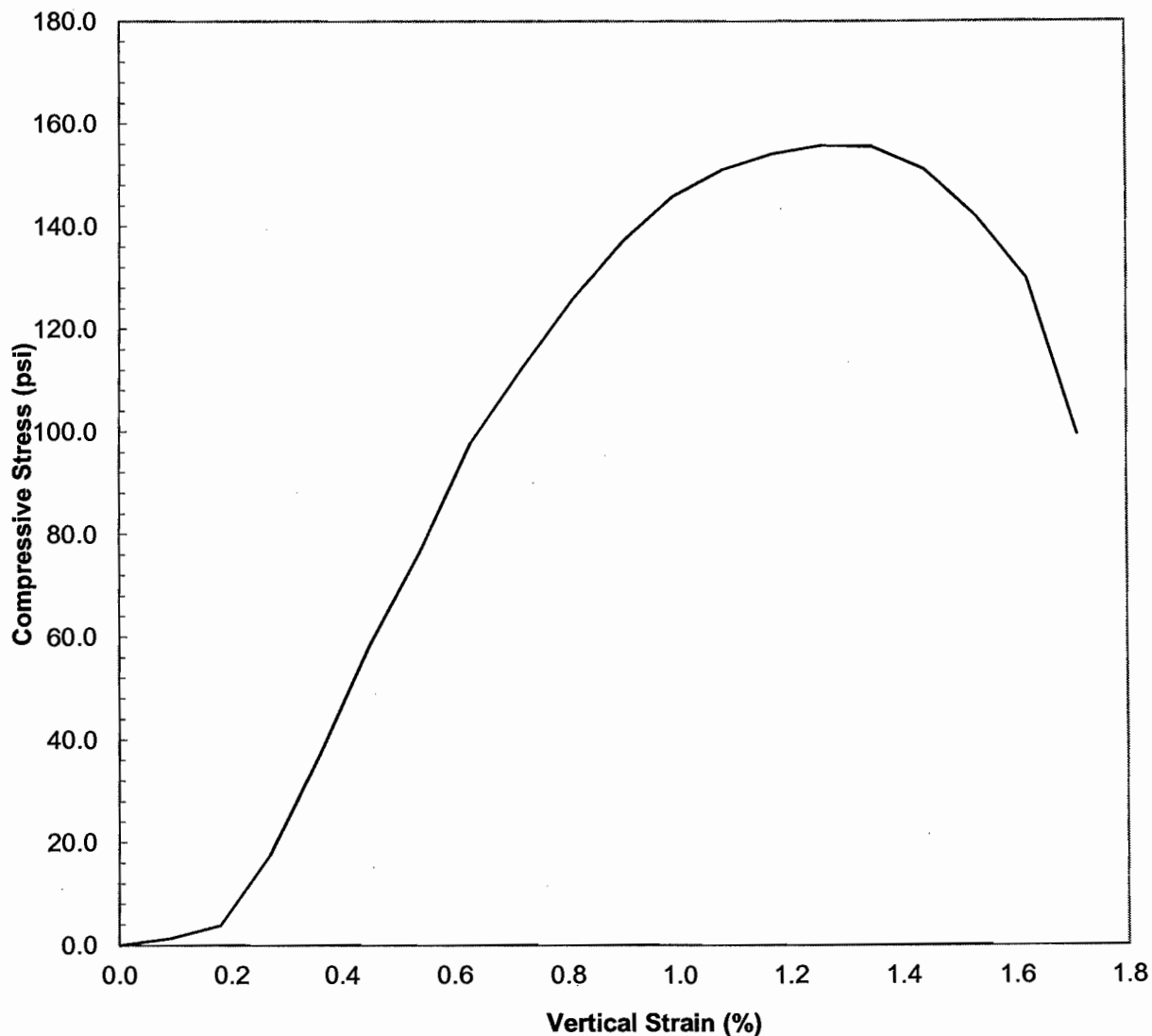
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 37-1, 9 day**

**Depth: N/A**

**ATL Sample No. AT1573S036**







# ATLANTIC TESTING LABORATORIES

**Albany**  
22 Corporate Drive  
Clifton Park, NY 12065  
518-383-9144 (T)  
518-383-9166 (F)

## TRANSMITTAL

January 27, 2011

AECOM  
40 British American Boulevard  
Latham, New York 12110

Attn: Mr. Scott Serviss

E/Mail: [scott.serviss@aecom.com](mailto:scott.serviss@aecom.com)

Re: Soil Laboratory Testing  
NGP Site  
Norwich, New York  
ATL Project No.: AT1573

Dear Mr. Serviss:

Enclosed are the following reports:

AT1573SL-37-1-11                      Unconfined Compressive Strength                      January 25, 2011

Please contact our office should you have any questions or if we may be of further service.

Sincerely,  
*ATLANTIC TESTING LABORATORIES, Limited*

Robert E. Field  
Laboratory Manager  
[bfield@atlantictesting.com](mailto:bfield@atlantictesting.com)

REF/nd

Enclosures



# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

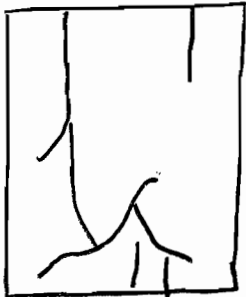
ATL Report No. AT1573SL-37-1-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 40-7

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	1/19/2011
Date of Test	1/26/2011
Age of Sample at Test Date	7 Days
Initial Dry Density (pcf)	75.3
Initial Water Content (%)	45.0
Unconfined Compressive Strength (psi)	141.1
Average Height (in.)	5.591
Average Diameter (in.)	2.996
Height-to-Diameter Ratio	1.87
Average Rate of Strain (%/min)	0.68
Strain at Failure (%)	1.7
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 1/27/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-37-1-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

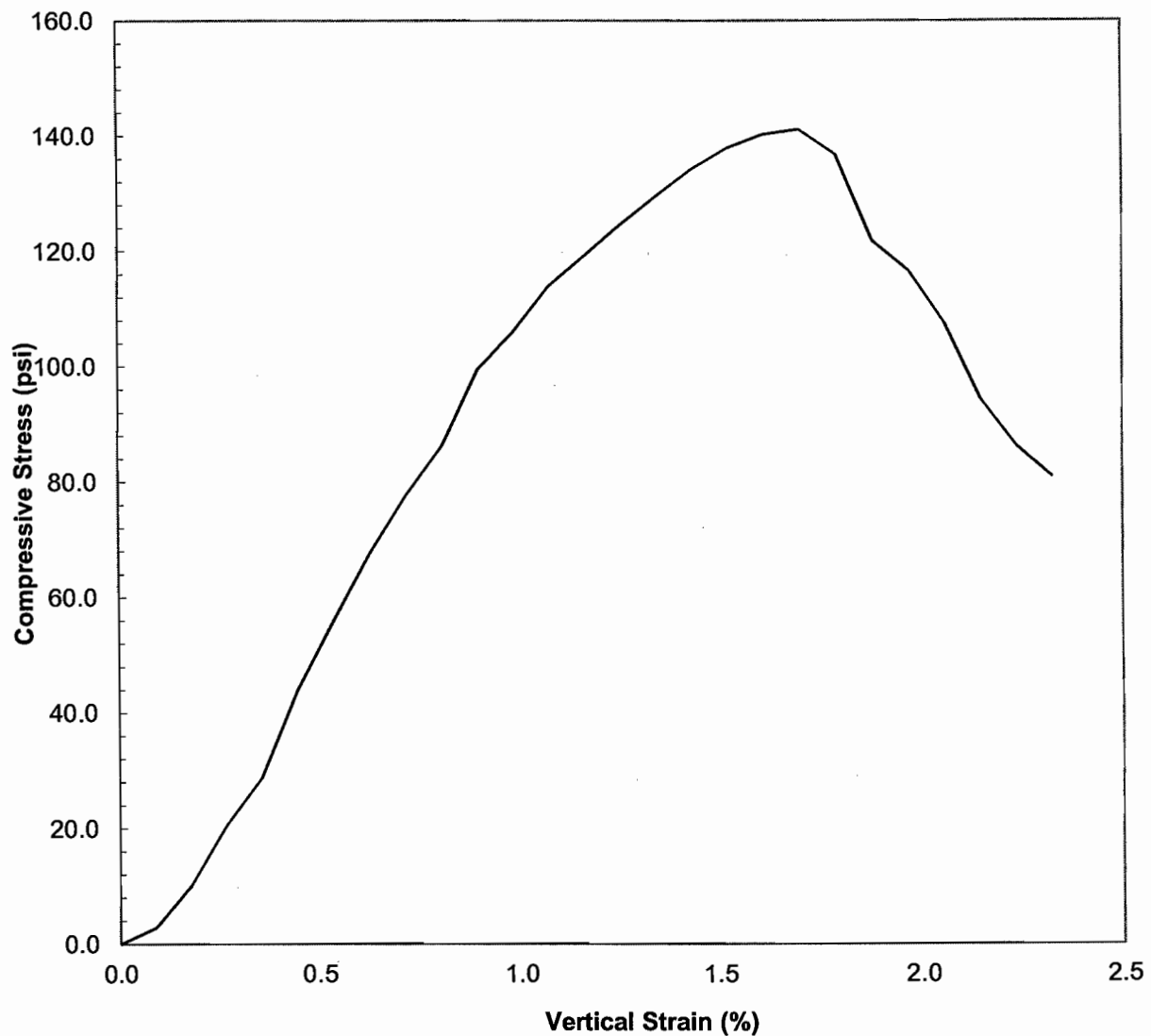
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 40-7, 7 day**

**Depth: N/A**

**ATL Sample No. AT1573S037**





# ATLANTIC TESTING LABORATORIES

**Albany**  
22 Corporate Drive  
Clifton Park, NY 12065  
518-383-9144 (T)  
518-383-9166 (F)

## TRANSMITTAL

February 1, 2011

AECOM  
40 British American Boulevard  
Latham, New York 12110

Attn: Mr. Scott Serviss

E/Mail: [scott.serviss@aecom.com](mailto:scott.serviss@aecom.com)

Re: Soil Laboratory Testing  
NGP Site  
Norwich, New York  
ATL Project No.: AT1573

Dear Mr. Serviss:

Enclosed are the following reports:

AT1573SL-38-1-11	Unconfined Compressive Strength	January 25, 2011
AT1573SL-39-1-11	Unconfined Compressive Strength	January 25, 2011
AT1573SL-40-1-11	Unconfined Compressive Strength	January 25, 2011

Please contact our office should you have any questions or if we may be of further service.

Sincerely,  
ATLANTIC TESTING LABORATORIES, Limited

Robert E. Field  
Laboratory Manager  
[bfield@atlantictesting.com](mailto:bfield@atlantictesting.com)

REF/nd

Enclosures



# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166


ATL Report No. AT1573SL-38-1-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 39-6

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	1/21/2011
Date of Test	1/28/2011
Age of Sample at Test Date	7 Days
Initial Dry Density (pcf)	75.2
Initial Water Content (%)	44.8
Unconfined Compressive Strength (psi)	223.1
Average Height (in.)	5.551
Average Diameter (in.)	3.003
Height-to-Diameter Ratio	1.85
Average Rate of Strain (%/min)	0.67
Strain at Failure (%)	1.3
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 2/1/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-38-1-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

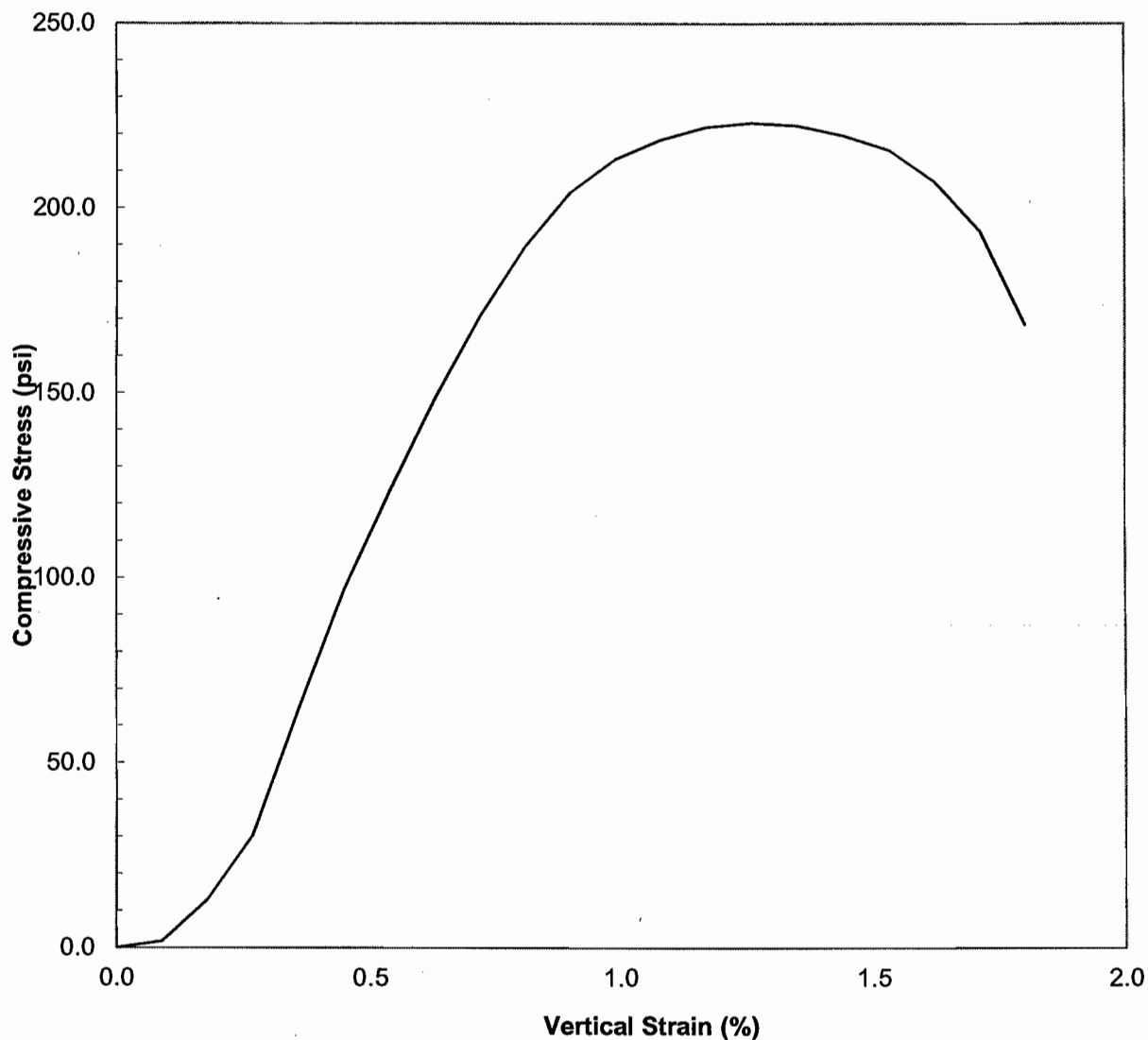
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 39-6, 7 day**

**Depth: N/A**

**ATL Sample No. AT1573S038**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

ATL Report No. AT1573SL-39-1-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 37-7

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	1/21/2011
Date of Test	1/28/2011
Age of Sample at Test Date	7 Days
Initial Dry Density (pcf)	70.8
Initial Water Content (%)	49.1
Unconfined Compressive Strength (psi)	143.7
Average Height (in.)	5.472
Average Diameter (in.)	3.005
Height-to-Diameter Ratio	1.82
Average Rate of Strain (%/min)	0.037
Strain at Failure (%)	1.6
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by:

Date: 2/1/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-39-1-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

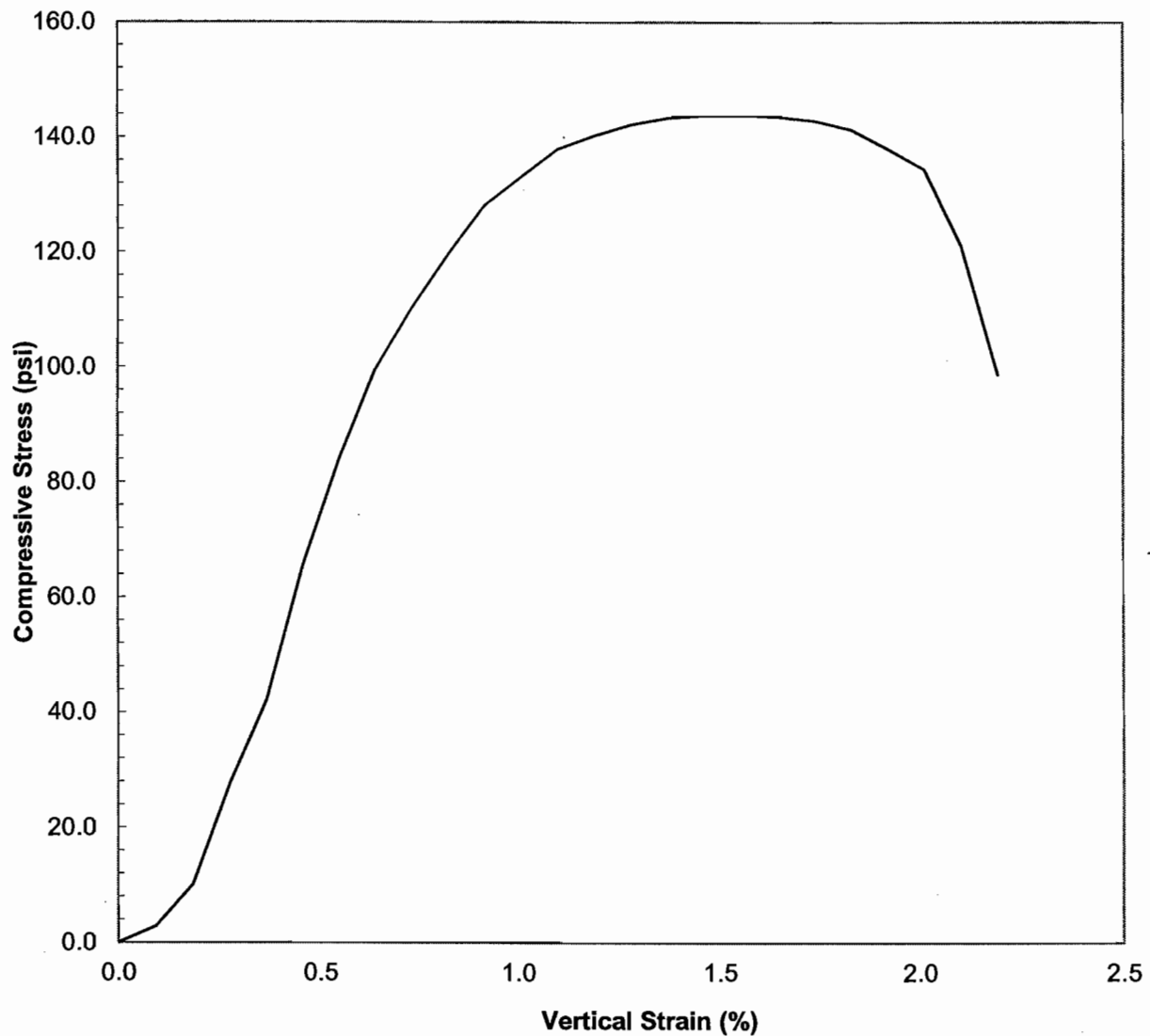
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 37-7, 7 day**

**Depth: N/A**

**ATL Sample No. AT1573S039**







# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

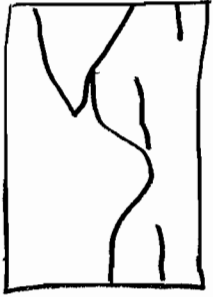
ATL Report No. AT1573SL-40-1-11

Client: \_\_\_\_\_ AECOM

Project: \_\_\_\_\_ NGP Site, Norwich, New York

Sample ID.: \_\_\_\_\_ 36-2

Sample Description: \_\_\_\_\_ Grout Column

Parameter	Results
Date Sample Cast	1/22/2011
Date of Test	1/31/2011
Age of Sample at Test Date	9 Days
Initial Dry Density (pcf)	77.1
Initial Water Content (%)	42.8
Unconfined Compressive Strength (psi)	120
Average Height (in.)	5.512
Average Diameter (in.)	2.990
Height-to-Diameter Ratio	1.84
Average Rate of Strain (%/min)	0.69
Strain at Failure (%)	1.9
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by:  \_\_\_\_\_

Date: 2/1/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-40-1-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

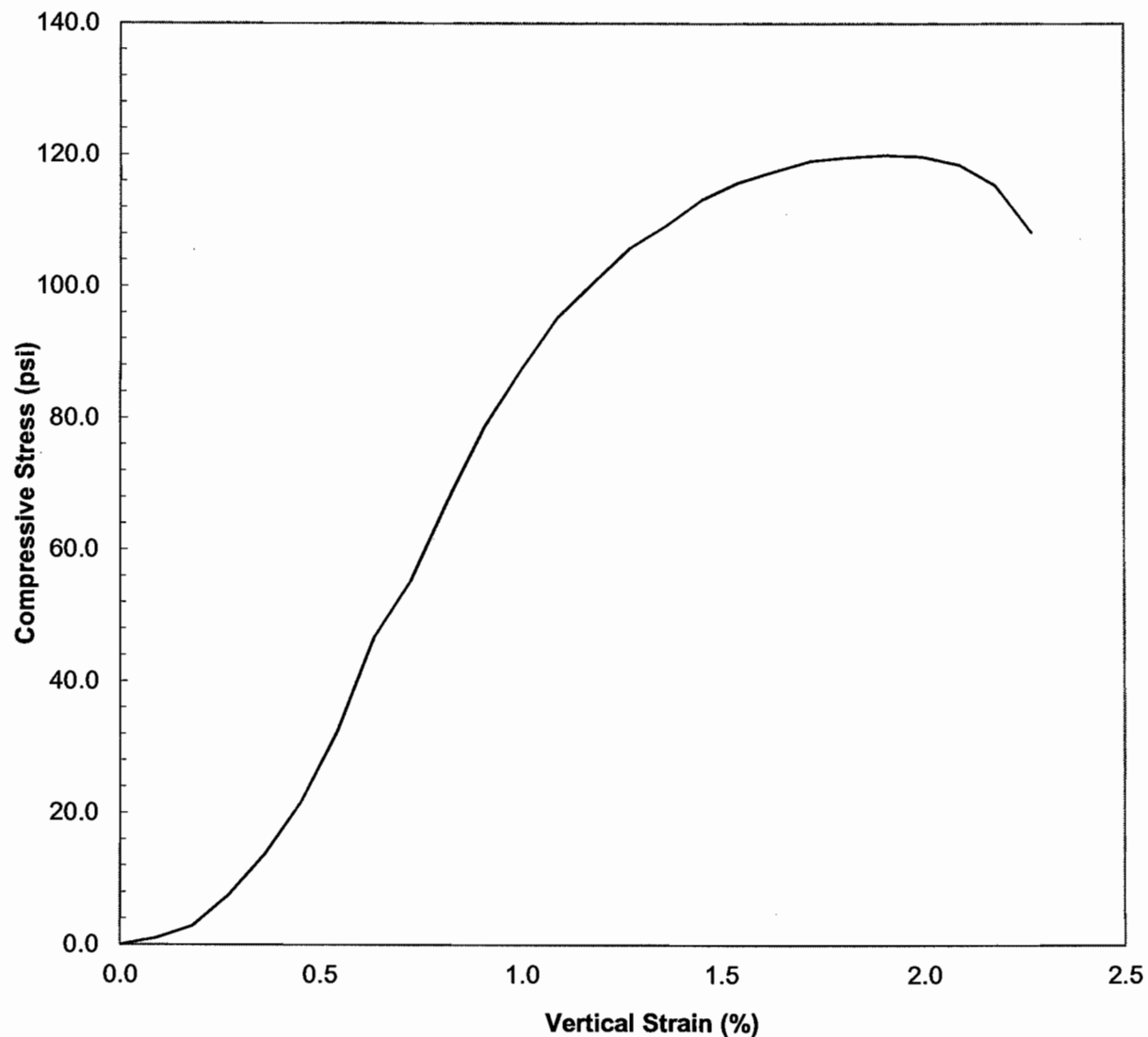
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 36-2, 9 day**

**Depth: N/A**

**ATL Sample No. AT1573S040**





# ATLANTIC TESTING LABORATORIES

**Albany**  
22 Corporate Drive  
Clifton Park, NY 12065  
518-383-9144 (T)  
518-383-9166 (F)

## TRANSMITTAL

February 7, 2011

AECOM  
40 British American Boulevard  
Latham, New York 12110

Attn: Mr. Scott Serviss

E/Mail: [scott.serviss@aecom.com](mailto:scott.serviss@aecom.com)

Re: Soil Laboratory Testing  
NGP Site  
Norwich, New York  
ATL Project No.: AT1573

Dear Mr. Serviss:

Enclosed are the following reports:

AT1573SL-41-2-11	Unconfined Compressive Strength	February 1, 2011
AT1573SL-42-2-11	Unconfined Compressive Strength	February 1, 2011
AT1573SL-43-2-11	Unconfined Compressive Strength	February 1, 2011
AT1573SL-44-2-11	Unconfined Compressive Strength	February 1, 2011

Please contact our office should you have any questions or if we may be of further service.

Sincerely,  
ATLANTIC TESTING LABORATORIES, Limited

Robert E. Field  
Laboratory Manager  
[bfield@atlantictesting.com](mailto:bfield@atlantictesting.com)

REF/nd

Enclosures



# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166


ATL Report No. AT1573SL-41-2-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 34-2

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	1/25/2011
Date of Test	2/3/2011
Age of Sample at Test Date	9 Days
Initial Dry Density (pcf)	77.8
Initial Water Content (%)	41.4
Unconfined Compressive Strength (psi)	275.9
Average Height (in.)	5.669
Average Diameter (in.)	3.003
Height-to-Diameter Ratio	1.89
Average Rate of Strain (%/min)	0.65
Strain at Failure (%)	1.4
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: [Signature]

Date: 2/7/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-41-2-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

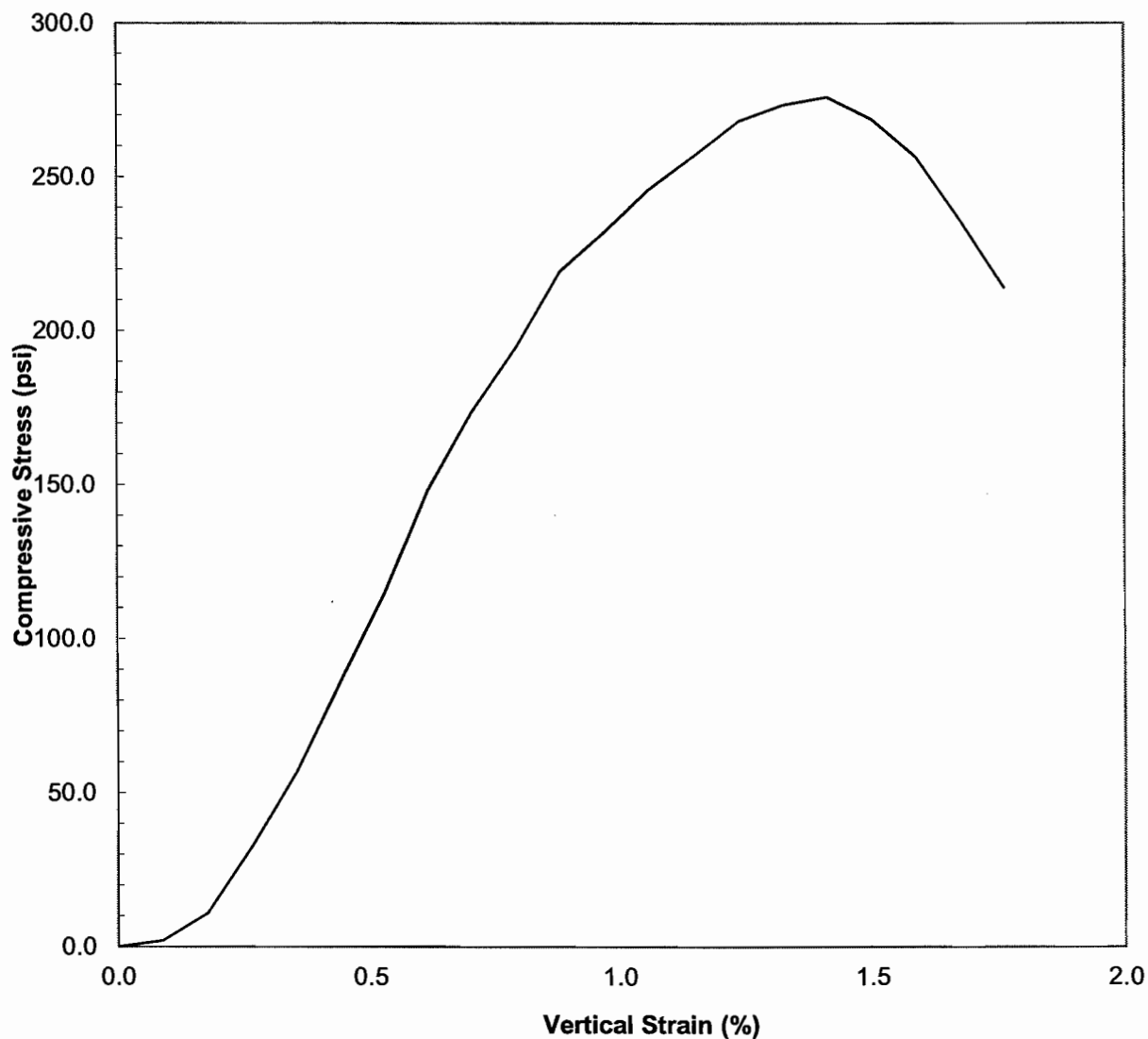
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 34-2, 9 day**

**Depth: N/A**

**ATL Sample No. AT1573S041**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166


ATL Report No. AT1573SL-42-2-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 34-6

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	1/26/2011
Date of Test	2/3/2011
Age of Sample at Test Date	8 Days
Initial Dry Density (pcf)	74.3
Initial Water Content (%)	44.6
Unconfined Compressive Strength (psi)	182.5
Average Height (in.)	5.433
Average Diameter (in.)	3.001
Height-to-Diameter Ratio	1.81
Average Rate of Strain (%/min)	0.68
Strain at Failure (%)	1.3
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 2/7/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-42-2-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

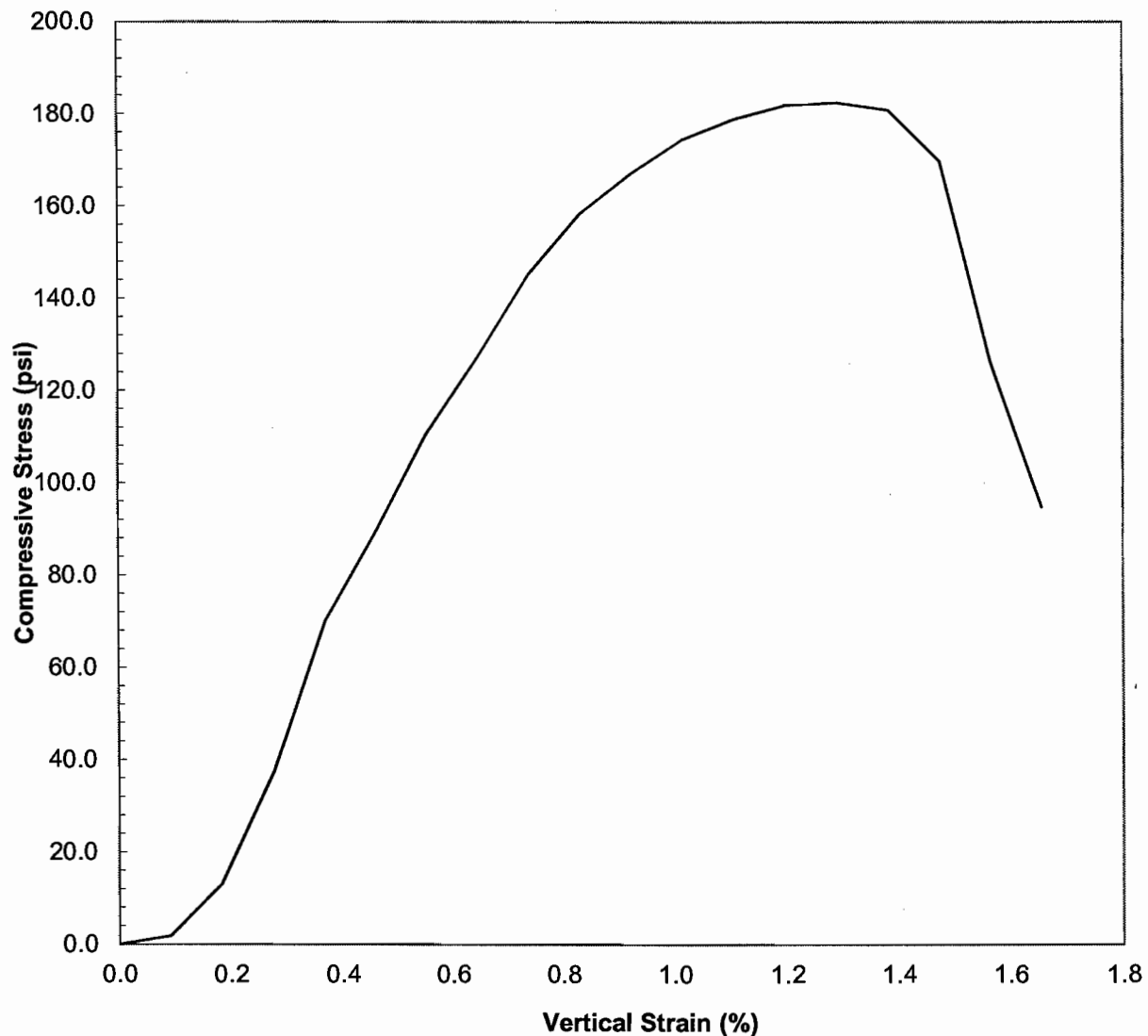
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 34-6, 8 day**

**Depth: N/A**

**ATL Sample No. AT1573S042**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

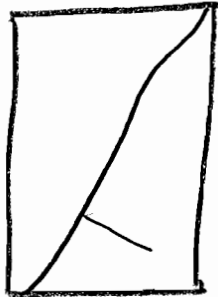
ATL Report No. AT1573SL-43-2-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 30-1

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	1/27/2011
Date of Test	2/3/2011
Age of Sample at Test Date	7 Days
Initial Dry Density (pcf)	77.5
Initial Water Content (%)	42.3
Unconfined Compressive Strength (psi)	227.0
Average Height (in.)	5.669
Average Diameter (in.)	2.999
Height-to-Diameter Ratio	1.89
Average Rate of Strain (%/min)	0.65
Strain at Failure (%)	1.1
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 2/7/11





# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-43-2-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

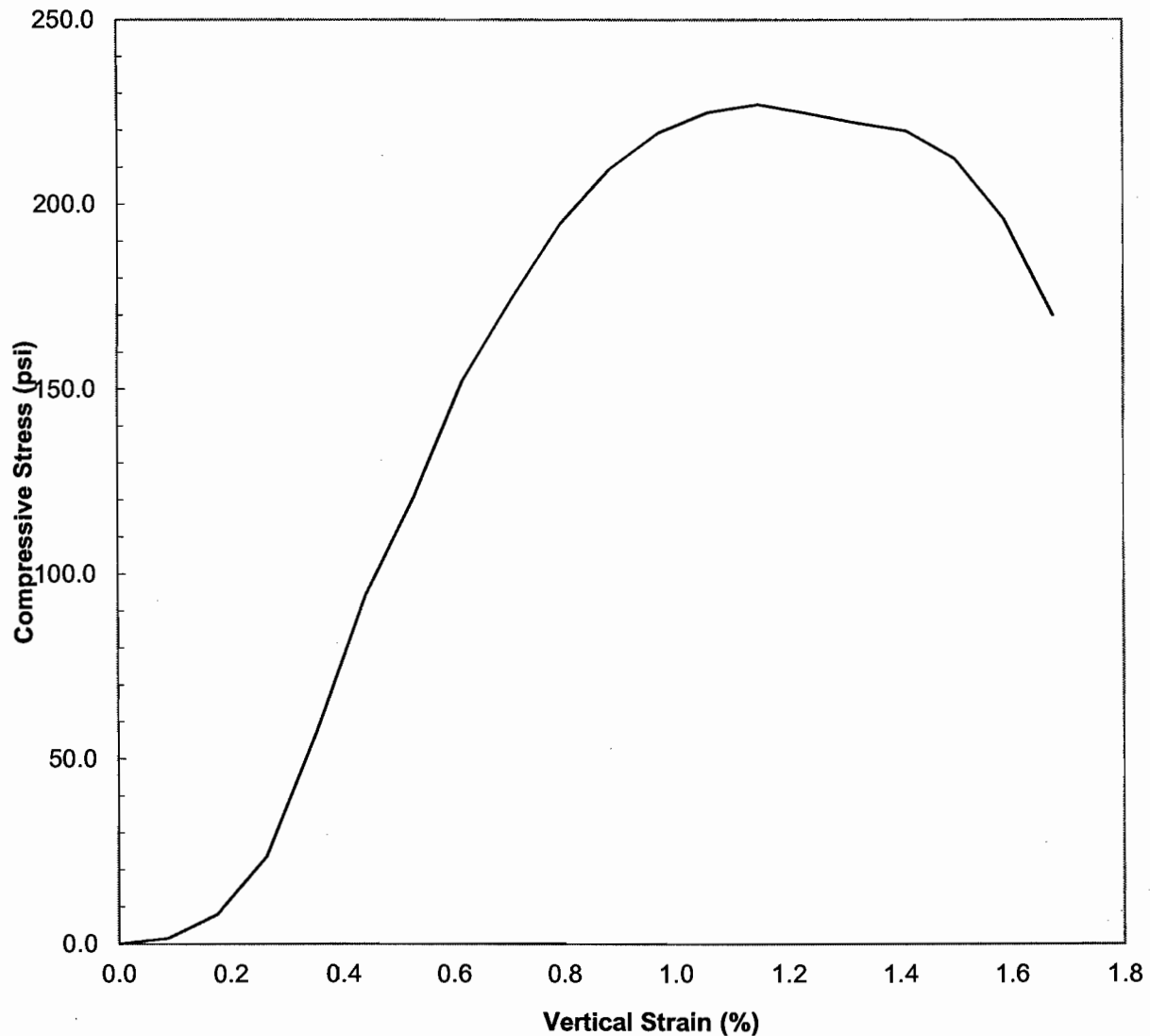
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 30-1, 7 day**

**Depth: N/A**

**ATL Sample No. AT1573S043**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

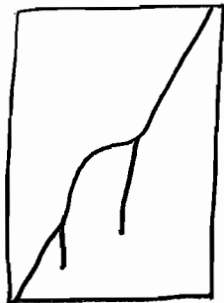
ATL Report No. AT1573SL-44-2-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 26-1

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	1/28/2011
Date of Test	2/4/2011
Age of Sample at Test Date	7 Days
Initial Dry Density (pcf)	77.9
Initial Water Content (%)	43.0
Unconfined Compressive Strength (psi)	343.1
Average Height (in.)	5.551
Average Diameter (in.)	2.993
Height-to-Diameter Ratio	1.85
Average Rate of Strain (%/min)	0.67
Strain at Failure (%)	1.3
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 2/7/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-44-2-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

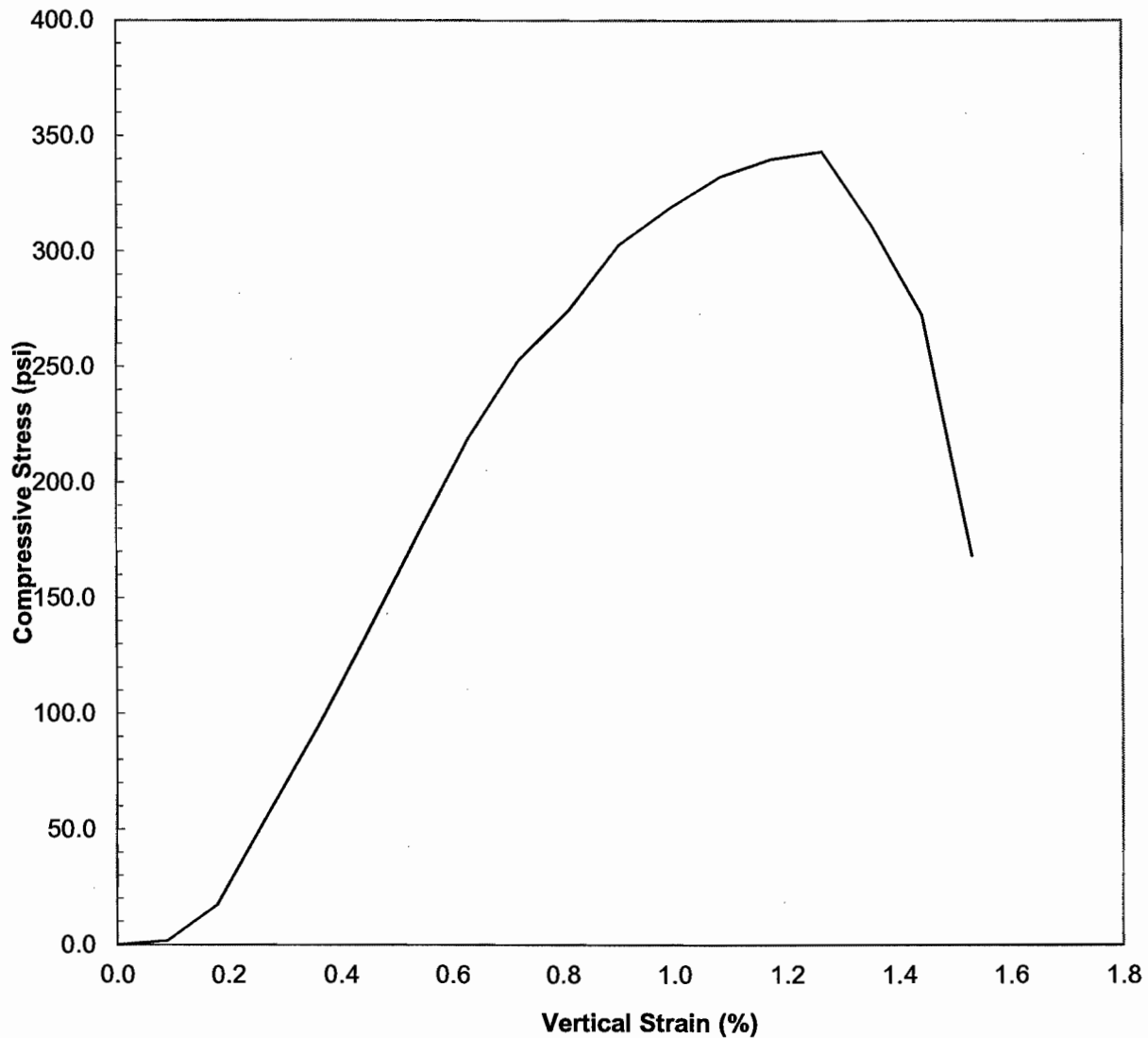
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 26-1, 7 day**

**Depth: N/A**

**ATL Sample No. AT1573S044**





# ATLANTIC TESTING LABORATORIES

**Albany**  
22 Corporate Drive  
Clifton Park, NY 12065  
518-383-9144 (T)  
518-383-9166 (F)

## TRANSMITTAL

February 8, 2011

AECOM  
40 British American Boulevard  
Latham, New York 12110

Attn: Mr. Scott Serviss

E/Mail: [scott.serviss@aecom.com](mailto:scott.serviss@aecom.com)

Re: Soil Laboratory Testing  
NGP Site  
Norwich, New York  
ATL Project No.: AT1573

Dear Mr. Serviss:

Enclosed are the following reports:

AT1573SL-45-2-11	Unconfined Compressive Strength	February 1, 2011
AT1573SL-46-2-11	Unconfined Compressive Strength	February 4, 2011

Please contact our office should you have any questions or if we may be of further service.

Sincerely,  
ATLANTIC TESTING LABORATORIES, Limited

Robert E. Field  
Laboratory Manager  
[bfield@atlantictesting.com](mailto:bfield@atlantictesting.com)

REF/nd

Enclosures



# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

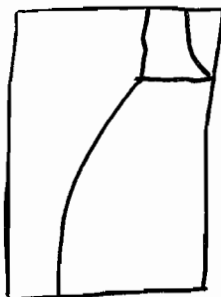
ATL Report No. AT1573SL-45-2-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 33-5

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	1/30/2011
Date of Test	2/7/2011
Age of Sample at Test Date	8 Days
Initial Dry Density (pcf)	78.6
Initial Water Content (%)	41.0
Unconfined Compressive Strength (psi)	176.6
Average Height (in.)	5.669
Average Diameter (in.)	2.997
Height-to-Diameter Ratio	1.89
Average Rate of Strain (%/min)	0.65
Strain at Failure (%)	1.1
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 2/8/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-45-2-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

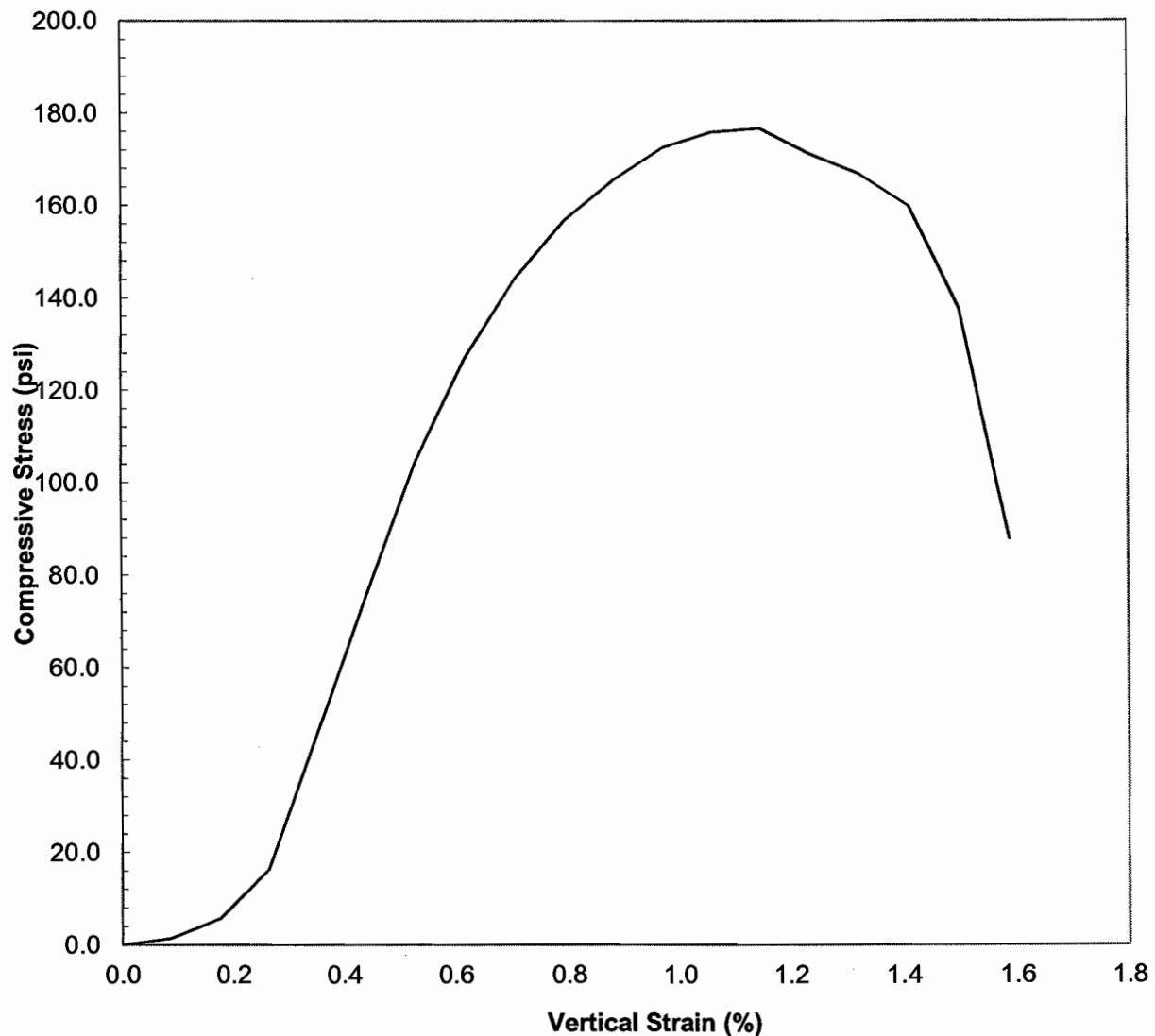
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 33-5, 8 day**

**Depth: N/A**

**ATL Sample No. AT1573S045**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166


ATL Report No. AT1573SL-46-2-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 32-4

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	1/31/2011
Date of Test	2/7/2011
Age of Sample at Test Date	7 Days
Initial Dry Density (pcf)	81.7
Initial Water Content (%)	38.1
Unconfined Compressive Strength (psi)	244.1
Average Height (in.)	5.551
Average Diameter (in.)	2.999
Height-to-Diameter Ratio	1.85
Average Rate of Strain (%/min)	0.67
Strain at Failure (%)	1.3
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 2/8/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-46-2-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

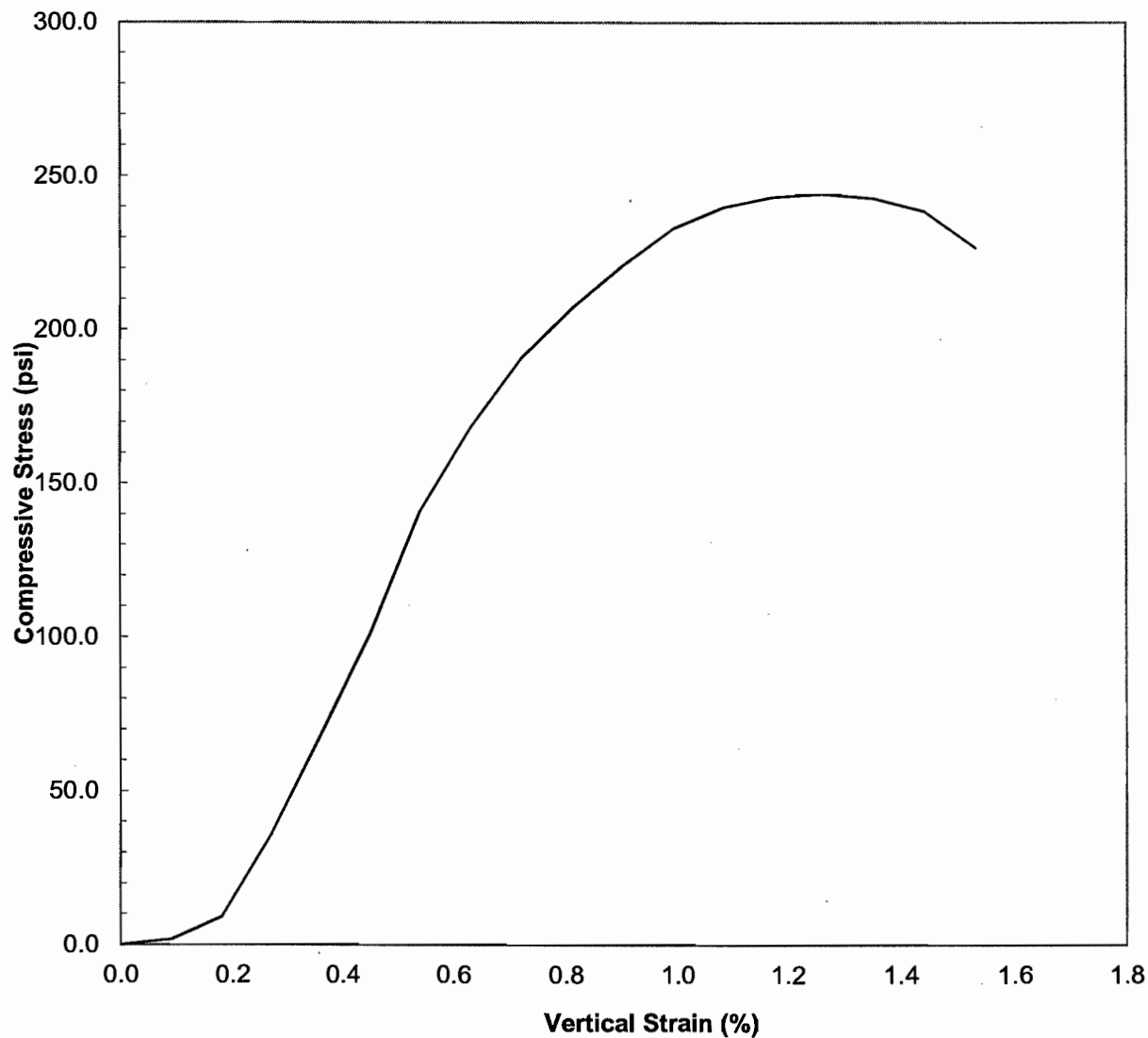
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 32-4, 7 day**

**Depth: N/A**

**ATL Sample No. AT1573S046**







# ATLANTIC TESTING LABORATORIES

**Albany**  
22 Corporate Drive  
Clifton Park, NY 12065  
518-383-9144 (T)  
518-383-9166 (F)

## TRANSMITTAL

February 9, 2011

AECOM  
40 British American Boulevard  
Latham, New York 12110

Attn: Mr. Scott Serviss

E/Mail: [scott.serviss@aecom.com](mailto:scott.serviss@aecom.com)

Re: Soil Laboratory Testing  
NGP Site  
Norwich, New York  
ATL Project No.: AT1573

Dear Mr. Serviss:

Enclosed are the following reports:

AT1573SL-47-2-11                      Unconfined Compressive Strength                      February 4, 2011

Please contact our office should you have any questions or if we may be of further service.

Sincerely,  
ATLANTIC TESTING LABORATORIES, Limited

Robert E. Field  
Laboratory Manager  
[bfield@atlantictesting.com](mailto:bfield@atlantictesting.com)

REF/nd

Enclosures



# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

ATL Report No. AT1573SL-47-2-11

Client: \_\_\_\_\_ AECOM

Project: \_\_\_\_\_ NGP Site, Norwich, New York

Sample ID.: \_\_\_\_\_ 30-9

Sample Description: \_\_\_\_\_ Grout Column

Parameter	Results
Date Sample Cast	2/1/2011
Date of Test	2/8/2011
Age of Sample at Test Date	7 Days
Initial Dry Density (pcf)	79.1
Initial Water Content (%)	41.5
Unconfined Compressive Strength (psi)	166.1
Average Height (in.)	5.551
Average Diameter (in.)	2.987
Height-to-Diameter Ratio	1.86
Average Rate of Strain (%/min)	0.67
Strain at Failure (%)	1.3
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: \_\_\_\_\_

Date: 2/9/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-47-2-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

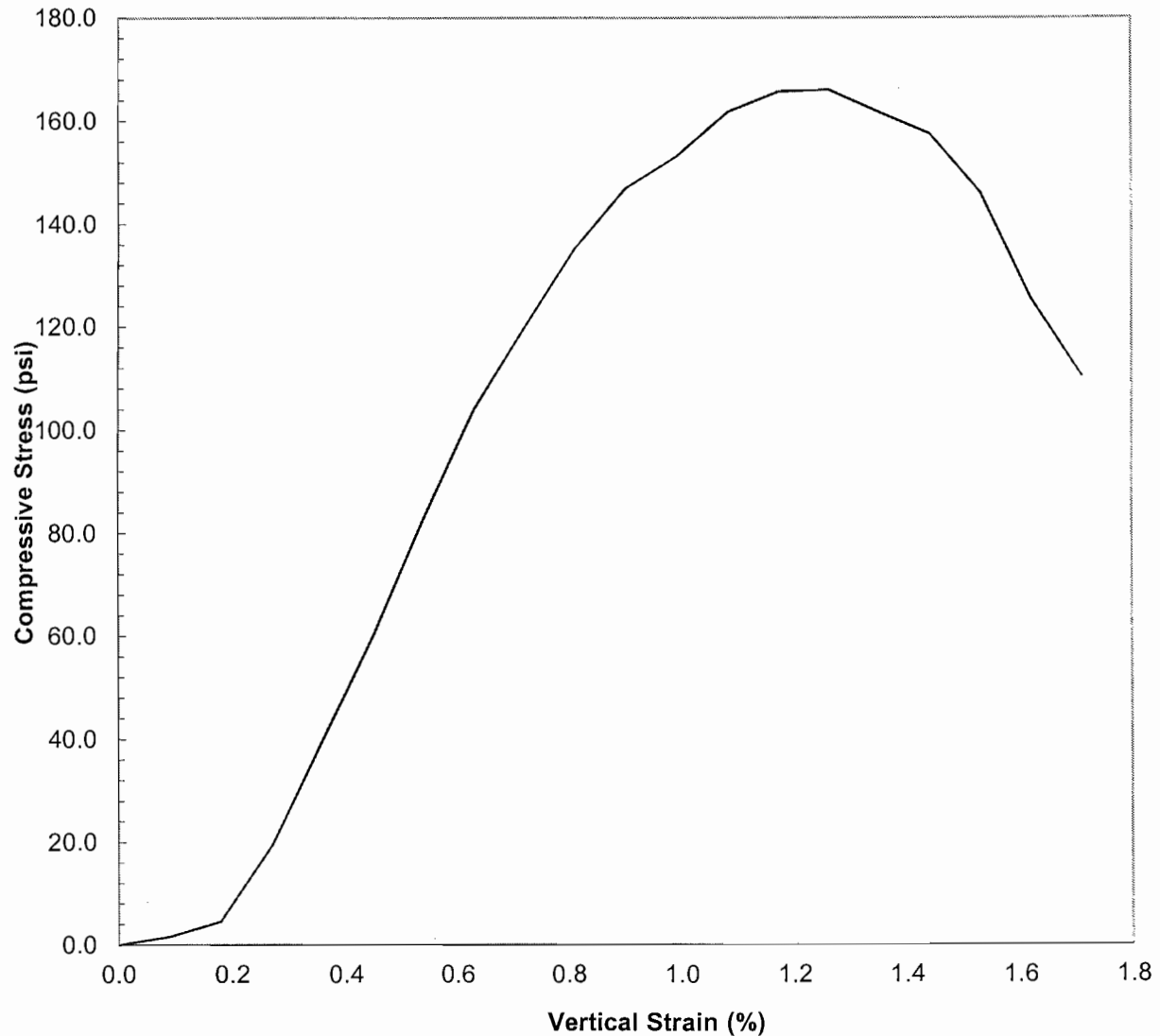
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 30-9, 7 day**

**Depth: N/A**

**ATL Sample No. AT1573S047**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166


ATL Report No. AT1573SL-48-2-11

Client: \_\_\_\_\_ AECOM


Project: \_\_\_\_\_ NGP Site, Norwich, New York

Sample ID.: \_\_\_\_\_ 29-6

Sample Description: \_\_\_\_\_ Grout Column

Parameter	Results
Date Sample Cast	2/2/2011
Date of Test	2/9/2011
Age of Sample at Test Date	7 Days
Initial Dry Density (pcf)	71.5
Initial Water Content (%)	46.4
Unconfined Compressive Strength (psi)	75.0
Average Height (in.)	5.551
Average Diameter (in.)	2.990
Height-to-Diameter Ratio	1.86
Average Rate of Strain (%/min)	0.67
Strain at Failure (%)	1.4
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by:  \_\_\_\_\_

Date: 2/10/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-48-2-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

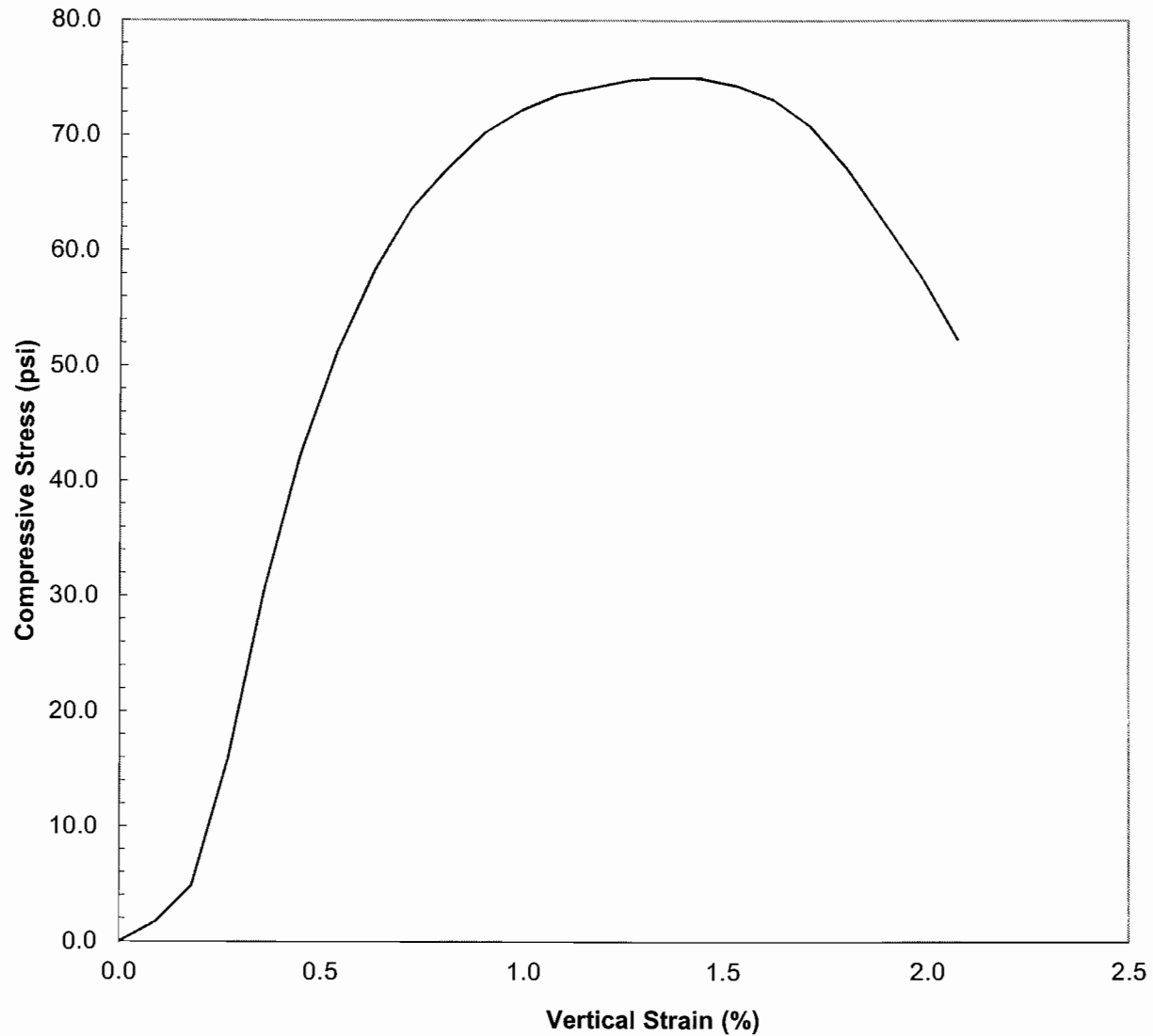
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 29-6, 7 day**

**Depth: N/A**

**ATL Sample No. AT1573S048**





# ATLANTIC TESTING LABORATORIES

**Albany**  
22 Corporate Drive  
Clifton Park, NY 12065  
518-383-9144 (T)  
518-383-9166 (F)

## TRANSMITTAL

February 14, 2011

AECOM  
40 British American Boulevard  
Latham, New York 12110

Attn: Mr. Scott Serviss

E/Mail: [scott.serviss@aecom.com](mailto:scott.serviss@aecom.com)

Re: Soil Laboratory Testing  
NGP Site  
Norwich, New York  
ATL Project No.: AT1573

Dear Mr. Serviss:

Enclosed are the following reports:

AT1573SL-49-2-11	Unconfined Compressive Strength	February 8, 2011
AT1573SL-50-2-11	Unconfined Compressive Strength	February 8, 2011

Please contact our office should you have any questions or if we may be of further service.

Sincerely,  
*ATLANTIC TESTING LABORATORIES, Limited*

Robert E. Field  
Laboratory Manager  
[bfield@atlantictesting.com](mailto:bfield@atlantictesting.com)

REF/nd

Enclosures



# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

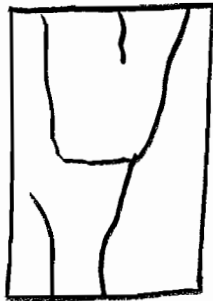
ATL Report No. AT1573SL-49-2-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 28-4

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	2/3/2011
Date of Test	2/11/2011
Age of Sample at Test Date	8 Days
Initial Dry Density (pcf)	75.7
Initial Water Content (%)	42.7
Unconfined Compressive Strength (psi)	104
Average Height (in.)	5.484
Average Diameter (in.)	2.996
Height-to-Diameter Ratio	1.83
Average Rate of Strain (%/min)	0.67
Strain at Failure (%)	1.8
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 2/11/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-49-2-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

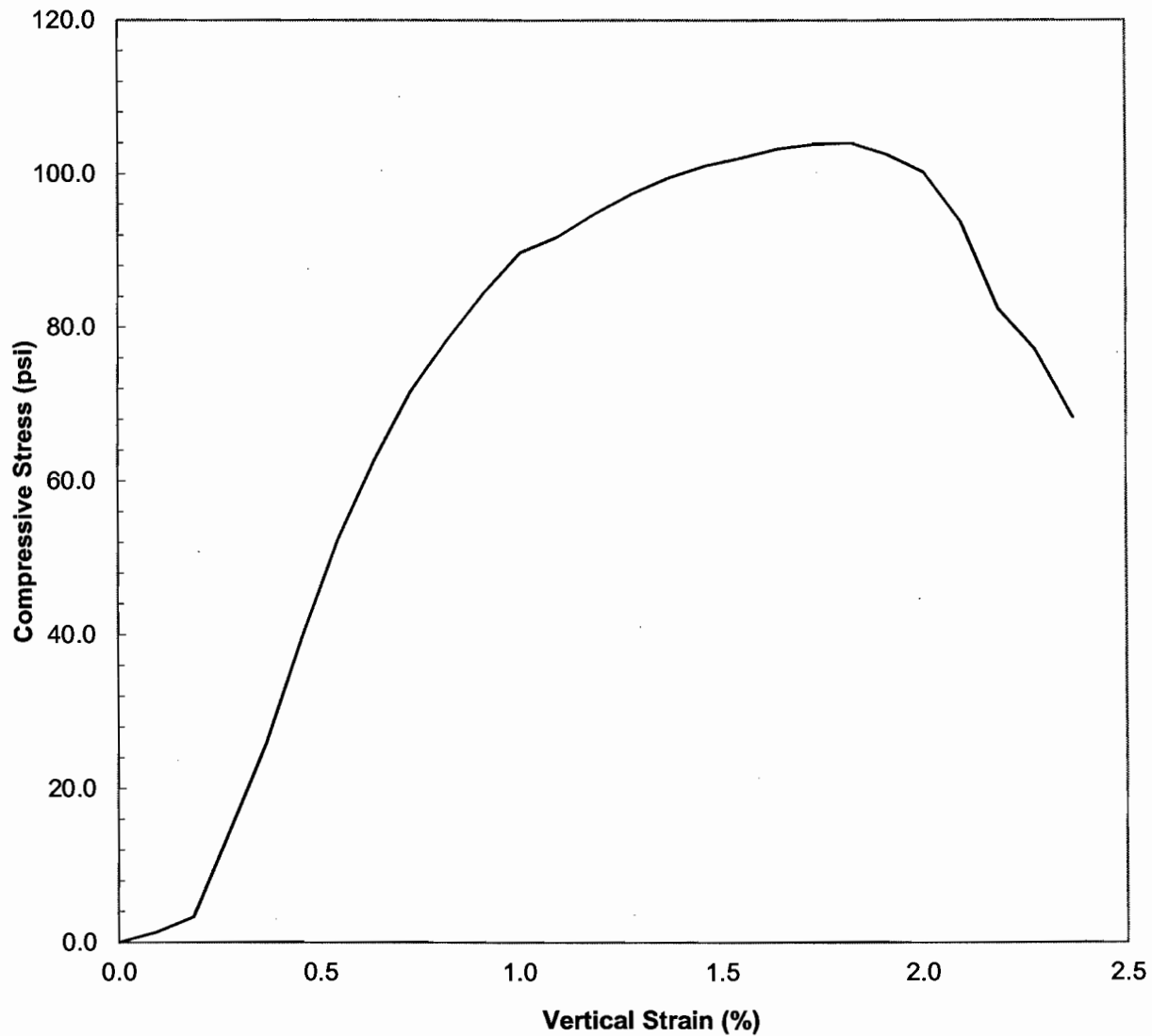
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 28-4, 8 day**

**Depth: N/A**

**ATL Sample No. AT1573S049**







# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

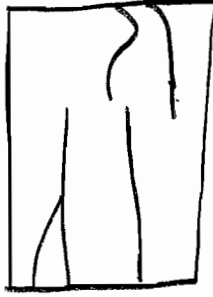
ATL Report No. AT1573SL-50-2-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 26-9

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	2/4/2011
Date of Test	2/11/2011
Age of Sample at Test Date	7 Days
Initial Dry Density (pcf)	73.2
Initial Water Content (%)	45.3
Unconfined Compressive Strength (psi)	135.0
Average Height (in.)	5.354
Average Diameter (in.)	2.992
Height-to-Diameter Ratio	1.79
Average Rate of Strain (%/min)	0.69
Strain at Failure (%)	1.3
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 2/14/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-50-2-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

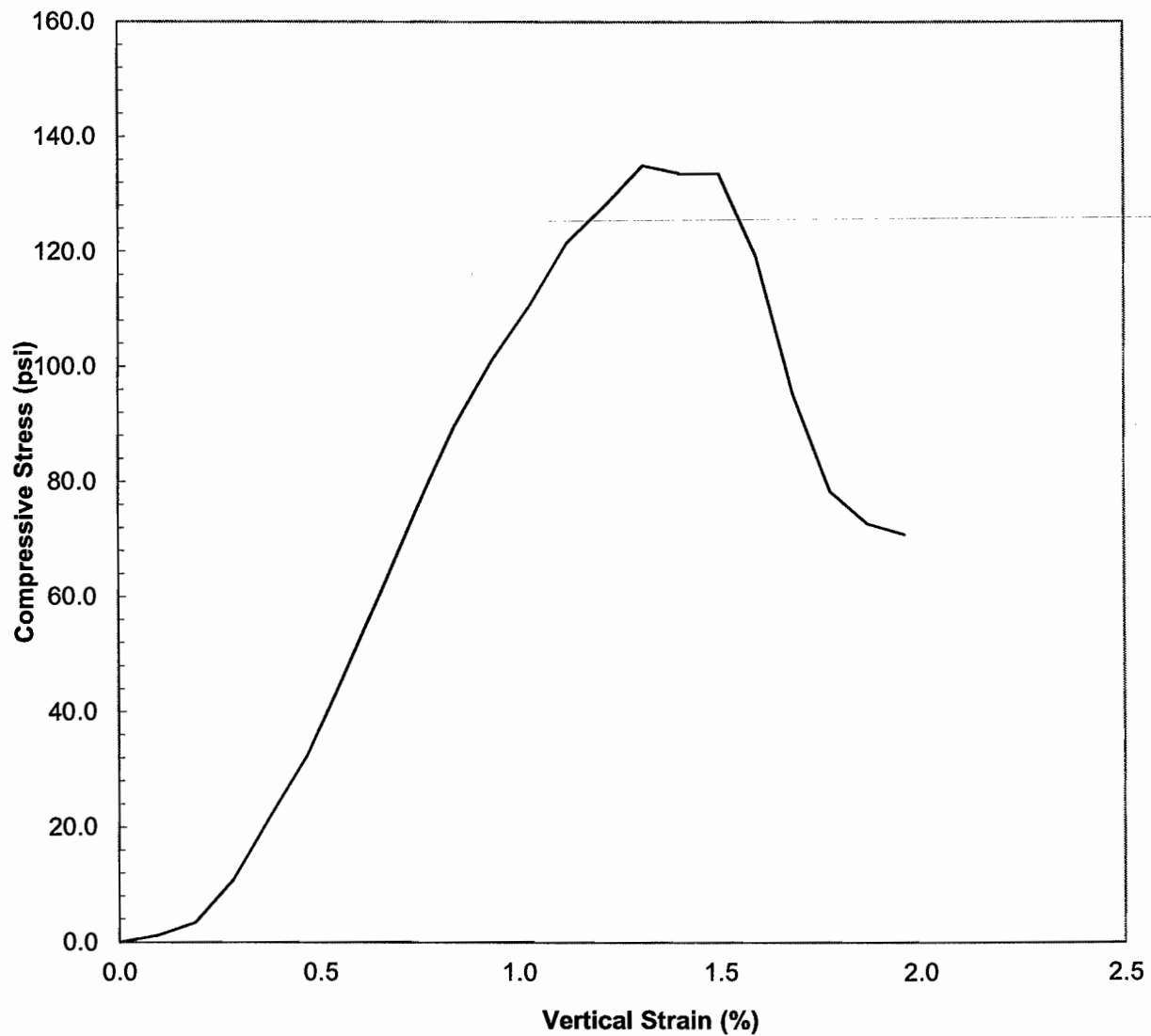
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 26-9,7 day**

**Depth: N/A**

**ATL Sample No. AT1573S050**





# ATLANTIC TESTING LABORATORIES

**Albany**  
22 Corporate Drive  
Clifton Park, NY 12065  
518-383-9144 (T)  
518-383-9166 (F)

## TRANSMITTAL

February 16, 2011

AECOM  
40 British American Boulevard  
Latham, New York 12110

Attn: Mr. Scott Serviss

E/Mail: [scott.serviss@aecom.com](mailto:scott.serviss@aecom.com)

Re: Soil Laboratory Testing  
NGP Site  
Norwich, New York  
ATL Project No.: AT1573

Dear Mr. Serviss:

Enclosed are the following reports:

AT1573SL-51-2-11	Unconfined Compressive Strength	February 10, 2011
AT1573SL-52-2-11	Unconfined Compressive Strength	February 10, 2011
AT1573SL-53-2-11	Unconfined Compressive Strength	February 10, 2011
AT1573SL-19D-12-10	Hydraulic Conductivity	February 4, 2011
AT1573SL-33A-1-11	Hydraulic Conductivity	January 25, 2011
AT1573SL-34A-1-11	Hydraulic Conductivity	January 25, 2011
AT1573SL-35A-1-11	Hydraulic Conductivity	January 25, 2011
AT1573SL-36A-1-11	Hydraulic Conductivity	January 25, 2011

Please contact our office should you have any questions or if we may be of further service.

Sincerely,  
ATLANTIC TESTING LABORATORIES, Limited

Robert E. Field  
Laboratory Manager  
[bfield@atlantictesting.com](mailto:bfield@atlantictesting.com)

REF/nd

Enclosures



# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

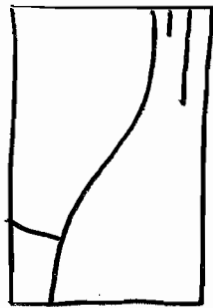
ATL Report No. AT1573SL-51-2-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 22-3

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	2/7/2011
Date of Test	2/14/2011
Age of Sample at Test Date	7 Days
Initial Dry Density (pcf)	74.9
Initial Water Content (%)	44.0
Unconfined Compressive Strength (psi)	231.6
Average Height (in.)	5.709
Average Diameter (in.)	2.996
Height-to-Diameter Ratio	1.91
Average Rate of Strain (%/min)	0.65
Strain at Failure (%)	1.2
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 2/16/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-51-2-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

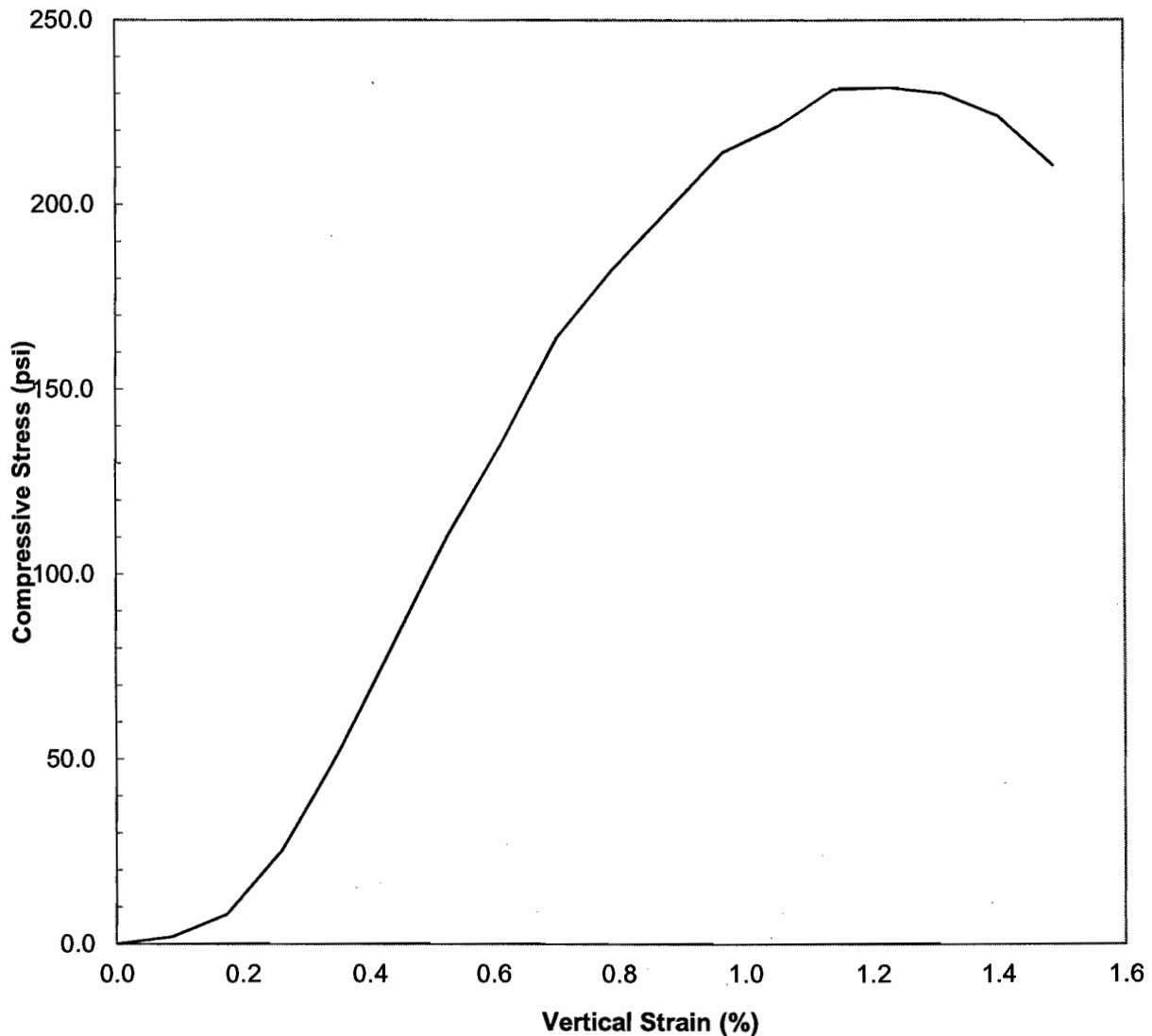
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 22-3, 7 day**

**Depth: N/A**

**ATL Sample No. AT1573S051**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

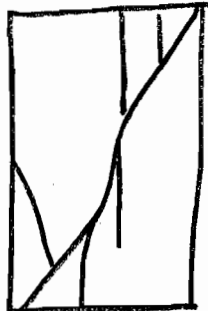
ATL Report No. AT1573SL-52-2-11

Client: AECOM


Project: NGP Site, Norwich, New York

Sample ID.: 23-1

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	2/7/2011
Date of Test	2/14/2011
Age of Sample at Test Date	7 Days
Initial Dry Density (pcf)	78.3
Initial Water Content (%)	39.5
Unconfined Compressive Strength (psi)	278.7
Average Height (in.)	5.709
Average Diameter (in.)	2.996
Height-to-Diameter Ratio	1.91
Average Rate of Strain (%/min)	0.65
Strain at Failure (%)	1.3
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 2/16/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-52-2-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

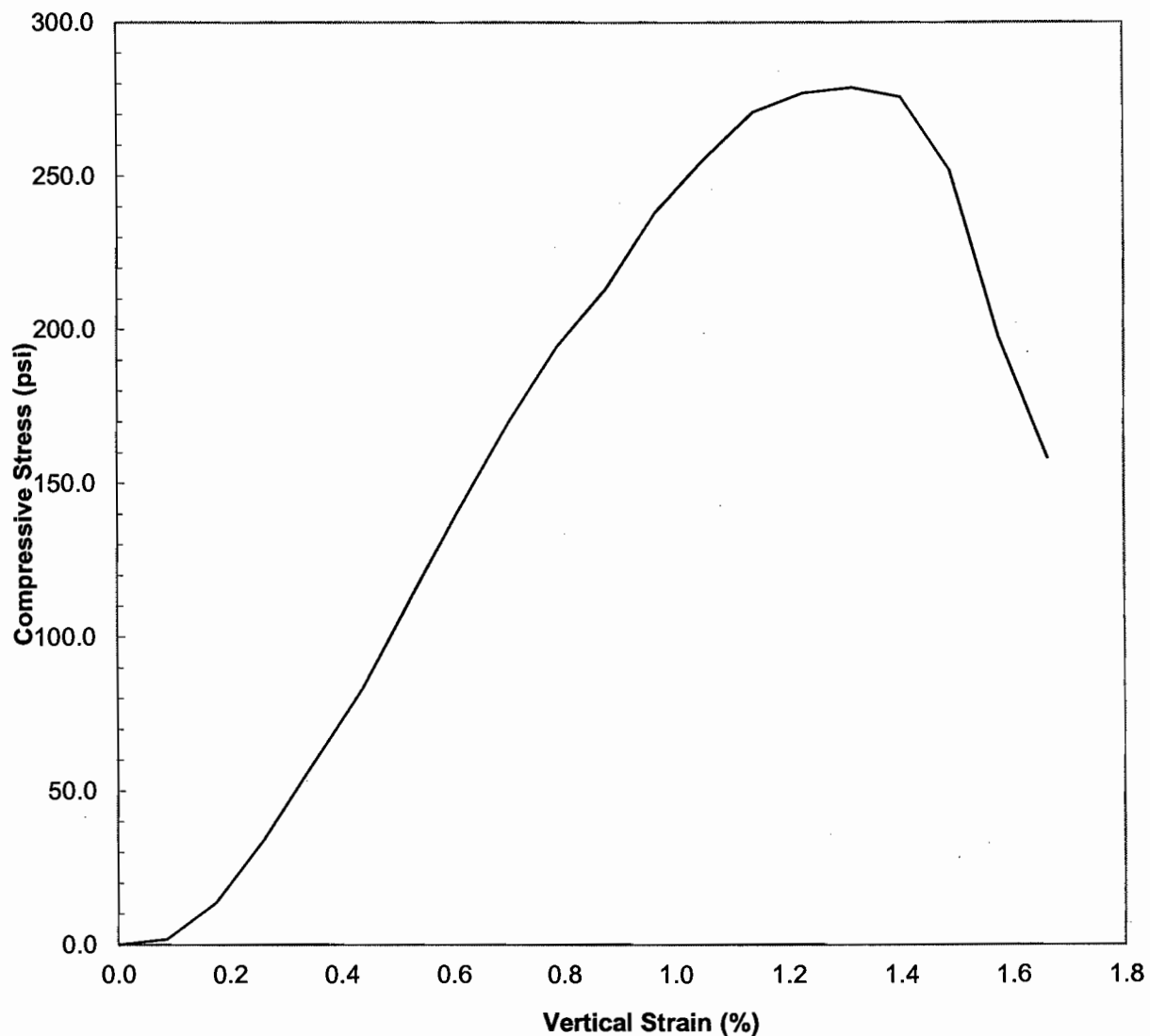
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 23-1, 7 day**

**Depth: N/A**

**ATL Sample No. AT1573S052**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

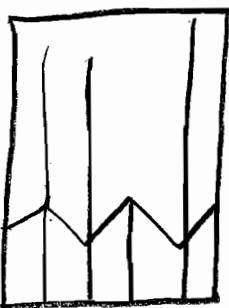
ATL Report No. AT1573SL-53-2-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 20-4

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	2/8/2011
Date of Test	2/15/2011
Age of Sample at Test Date	7 Days
Initial Dry Density (pcf)	70.4
Initial Water Content (%)	48.3
Unconfined Compressive Strength (psi)	177.6
Average Height (in.)	5.551
Average Diameter (in.)	3.000
Height-to-Diameter Ratio	1.85
Average Rate of Strain (%/min)	0.67
Strain at Failure (%)	1.3
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 2/16/11





# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-53-2-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

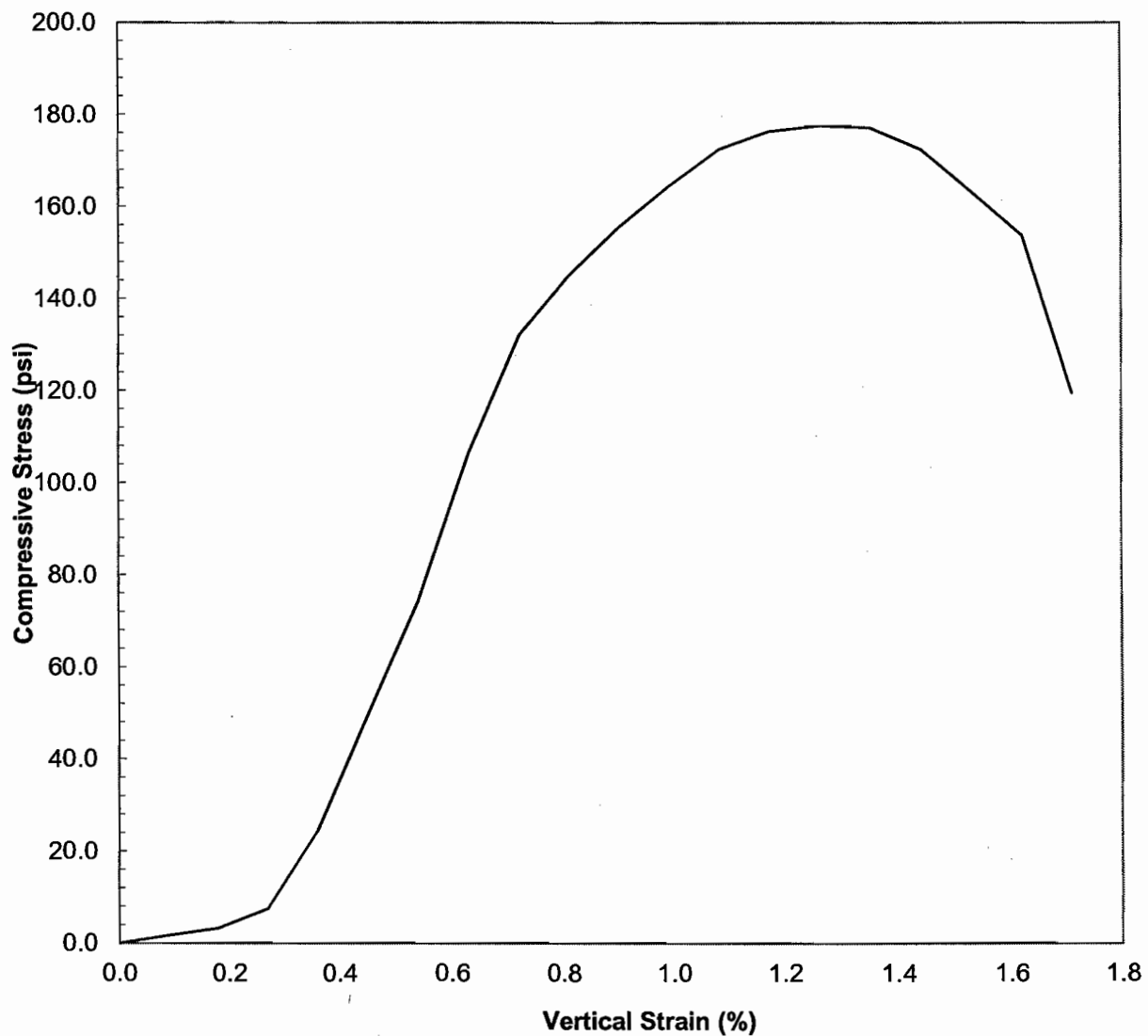
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 20-4, 7 day**

**Depth: N/A**

**ATL Sample No. AT1573S053**





# ATLANTIC TESTING LABORATORIES

**Albany**  
22 Corporate Drive  
Clifton Park, NY 12065  
518-383-9144 (T)  
518-383-9166 (F)

## TRANSMITTAL

February 17, 2011

AECOM  
40 British American Boulevard  
Latham, New York 12110

Attn: Mr. Scott Serviss

E/Mail: [scott.serviss@aecom.com](mailto:scott.serviss@aecom.com)

Re: Soil Laboratory Testing  
NGP Site  
Norwich, New York  
ATL Project No.: AT1573

Dear Mr. Serviss:

Enclosed are the following reports:

AT1573SL-54-2-11                      Unconfined Compressive Strength                      February 15, 2011

Please contact our office should you have any questions or if we may be of further service.

Sincerely,  
ATLANTIC TESTING LABORATORIES, Limited

Robert E. Field  
Laboratory Manager  
[bfield@atlantictesting.com](mailto:bfield@atlantictesting.com)

REF/nd

Enclosures



# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

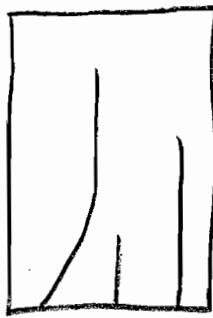
ATL Report No. AT1573SL-54-2-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 15-1

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	2/9/2011
Date of Test	2/16/2011
Age of Sample at Test Date	7 Days
Initial Dry Density (pcf)	68.8
Initial Water Content (%)	52.8
Unconfined Compressive Strength (psi)	105.0
Average Height (in.)	5.551
Average Diameter (in.)	2.995
Height-to-Diameter Ratio	1.85
Average Rate of Strain (%/min)	0.67
Strain at Failure (%)	1.1
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 2/17/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-54-2-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

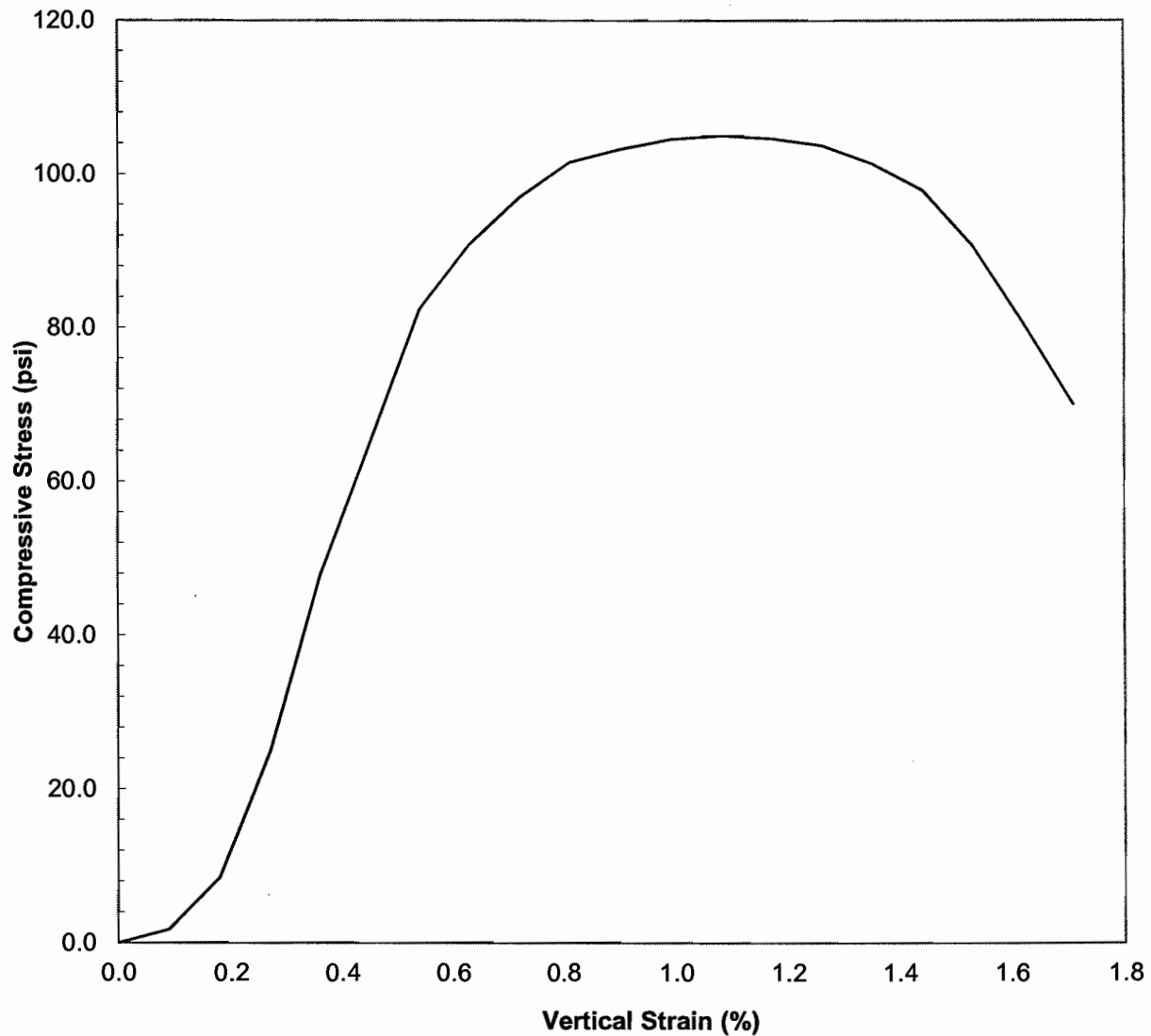
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 15-1, 7 day**

**Depth: N/A**

**ATL Sample No. AT1573S054**





# ATLANTIC TESTING LABORATORIES

**Albany**  
22 Corporate Drive  
Clifton Park, NY 12065  
518-383-9144 (T)  
518-383-9166 (F)

## TRANSMITTAL

February 18, 2011

AECOM  
40 British American Boulevard  
Latham, New York 12110

Attn: Mr. Scott Serviss

E/Mail: [scott.serviss@aecom.com](mailto:scott.serviss@aecom.com)

Re: Soil Laboratory Testing  
NGP Site  
Norwich, New York  
ATL Project No.: AT1573

Dear Mr. Serviss:

Enclosed are the following reports:

AT1573SL-55-2-11	Unconfined Compressive Strength	February 15, 2011
AT1573SL-22C-12-10	Hydraulic Conductivity	February 4, 2011
AT1573SL-37A-1-11	Hydraulic Conductivity	February 1, 2011
AT1573SL-38A-1-11	Hydraulic Conductivity	February 1, 2011
AT1573SL-39A-1-11	Hydraulic Conductivity	February 1, 2011
AT1573SL-40A-1-11	Hydraulic Conductivity	February 1, 2011

Please contact our office should you have any questions or if we may be of further service.

Sincerely,  
ATLANTIC TESTING LABORATORIES, Limited

Robert E. Field  
Laboratory Manager  
[bfield@atlantictesting.com](mailto:bfield@atlantictesting.com)

REF/nd

Enclosures



# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166


ATL Report No. AT1573SL-55-2-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 14-4

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	2/10/2011
Date of Test	2/17/2011
Age of Sample at Test Date	7 Days
Initial Dry Density (pcf)	77.6
Initial Water Content (%)	40.4
Unconfined Compressive Strength (psi)	215.4
Average Height (in.)	5.433
Average Diameter (in.)	2.996
Height-to-Diameter Ratio	1.81
Average Rate of Strain (%/min)	0.68
Strain at Failure (%)	1.1
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 2/18/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-55-2-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

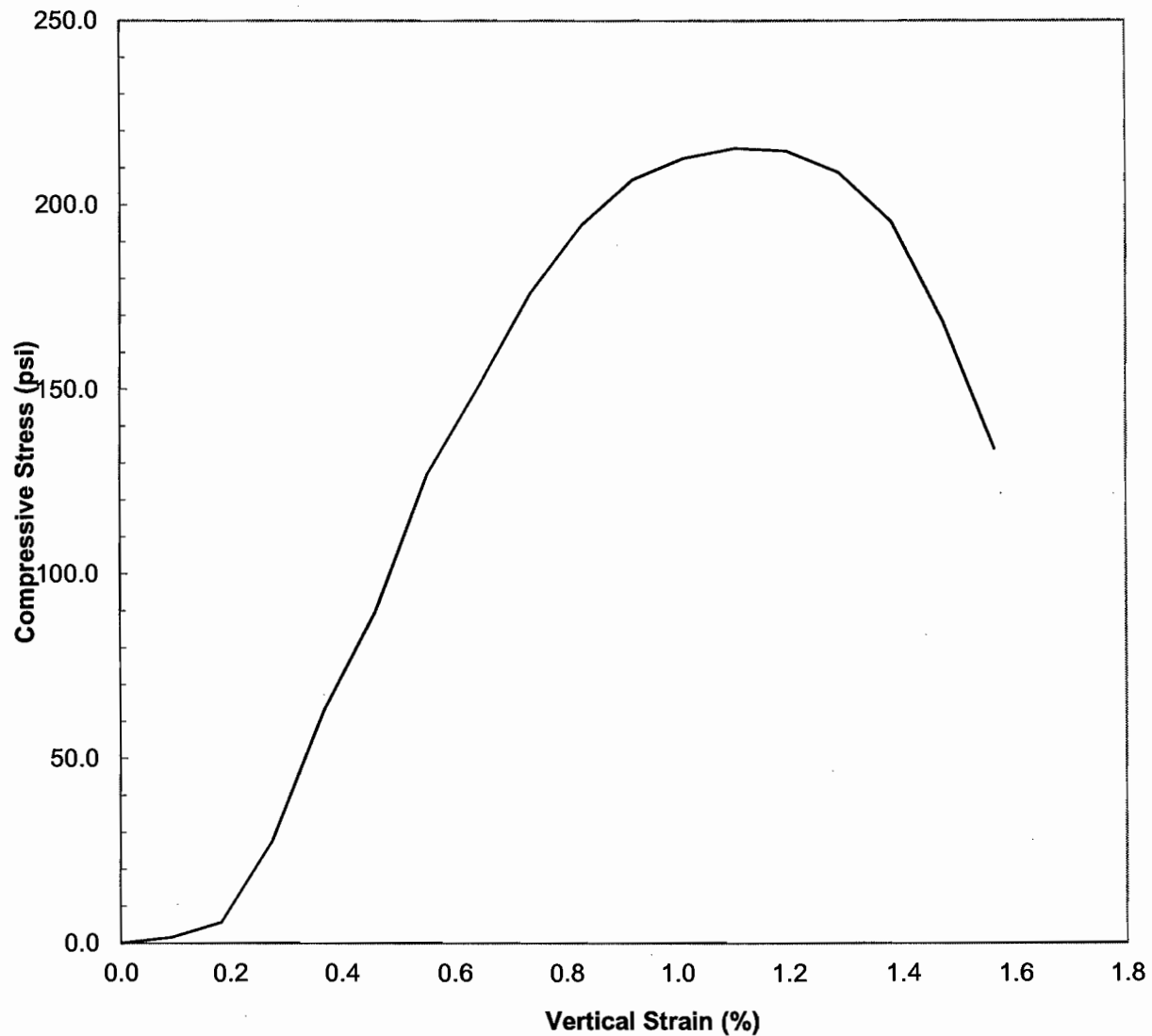
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 14-4, 7 day**

**Depth: N/A**

**ATL Sample No. AT1573S055**





# ATLANTIC TESTING LABORATORIES

**Albany**  
22 Corporate Drive  
Clifton Park, NY 12065  
518-383-9144 (T)  
518-383-9166 (F)

## TRANSMITTAL

February 21, 2011

AECOM  
40 British American Boulevard  
Latham, New York 12110

Attn: Mr. Scott Serviss

E/Mail: [scott.serviss@aecom.com](mailto:scott.serviss@aecom.com)

Re: Soil Laboratory Testing  
NGP Site  
Norwich, New York  
ATL Project No.: AT1573

Dear Mr. Serviss:

Enclosed are the following reports:

AT1573SL-56-2-11

Unconfined Compressive Strength

February 15, 2011

Please contact our office should you have any questions or if we may be of further service.

Sincerely,  
*ATLANTIC TESTING LABORATORIES, Limited*

Robert E. Field  
Laboratory Manager  
[bfield@atlantictesting.com](mailto:bfield@atlantictesting.com)

REF/nd

Enclosures





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

ATL Report No. AT1573SL-56-2-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 13-3

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	2/11/2011
Date of Test	2/18/2011
Age of Sample at Test Date	7 Days
Initial Dry Density (pcf)	75.4
Initial Water Content (%)	44.8
Unconfined Compressive Strength (psi)	268.4
Average Height (in.)	5.591
Average Diameter (in.)	2.995
Height-to-Diameter Ratio	1.87
Average Rate of Strain (%/min)	0.66
Strain at Failure (%)	1.1
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by:

Date: 2/21/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-56-2-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

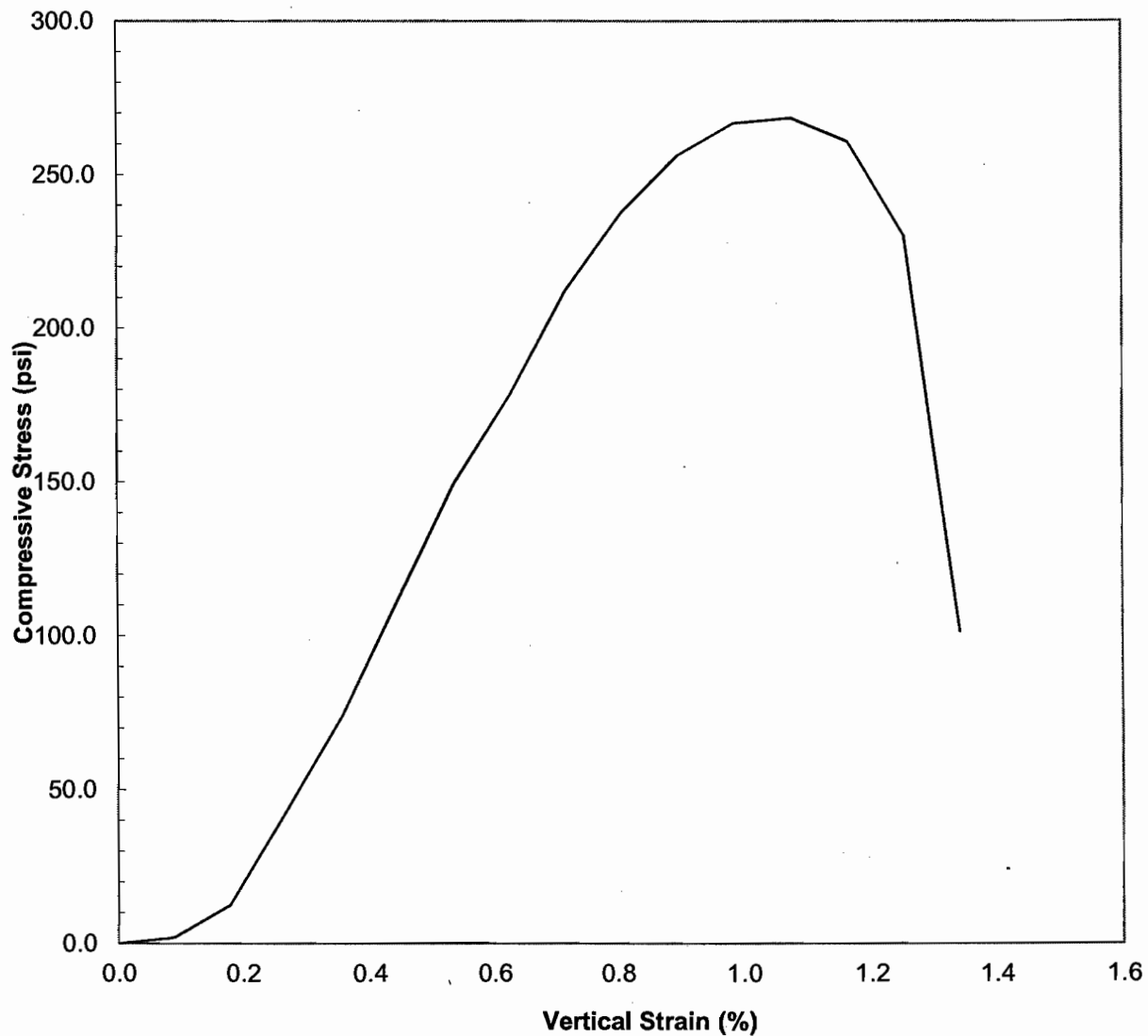
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 13-3, 7 day**

**Depth: N/A**

**ATL Sample No. AT1573S056**





# ATLANTIC TESTING LABORATORIES

**Albany**  
22 Corporate Drive  
Clifton Park, NY 12065  
518-383-9144 (T)  
518-383-9166 (F)

## TRANSMITTAL

February 22, 2011

AECOM  
40 British American Boulevard  
Latham, New York 12110

Attn: Mr. Scott Serviss

E/Mail: [scott.serviss@aecom.com](mailto:scott.serviss@aecom.com)

Re: Soil Laboratory Testing  
NGP Site  
Norwich, New York  
ATL Project No.: AT1573

Dear Mr. Serviss:

Enclosed are the following reports:

AT1573SL-57-2-11	Unconfined Compressive Strength	February 15, 2011
AT1573SL-58-2-11	Unconfined Compressive Strength	February 17, 2011

Please contact our office should you have any questions or if we may be of further service.

Sincerely,  
ATLANTIC TESTING LABORATORIES, Limited

Robert E. Field  
Laboratory Manager  
[bfield@atlantictesting.com](mailto:bfield@atlantictesting.com)

REF/nd

Enclosures



# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

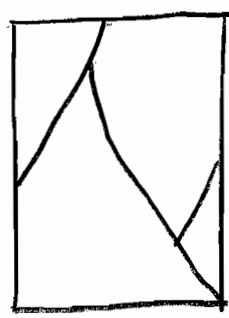
ATL Report No. AT1573SL-57-2-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 8-3

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	2/12/2011
Date of Test	2/21/2011
Age of Sample at Test Date	9 Days
Initial Dry Density (pcf)	79.1
Initial Water Content (%)	39.4
Unconfined Compressive Strength (psi)	177.4
Average Height (in.)	5.669
Average Diameter (in.)	3.000
Height-to-Diameter Ratio	1.89
Average Rate of Strain (%/min)	0.65
Strain at Failure (%)	1.2
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 2/22/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-57-2-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

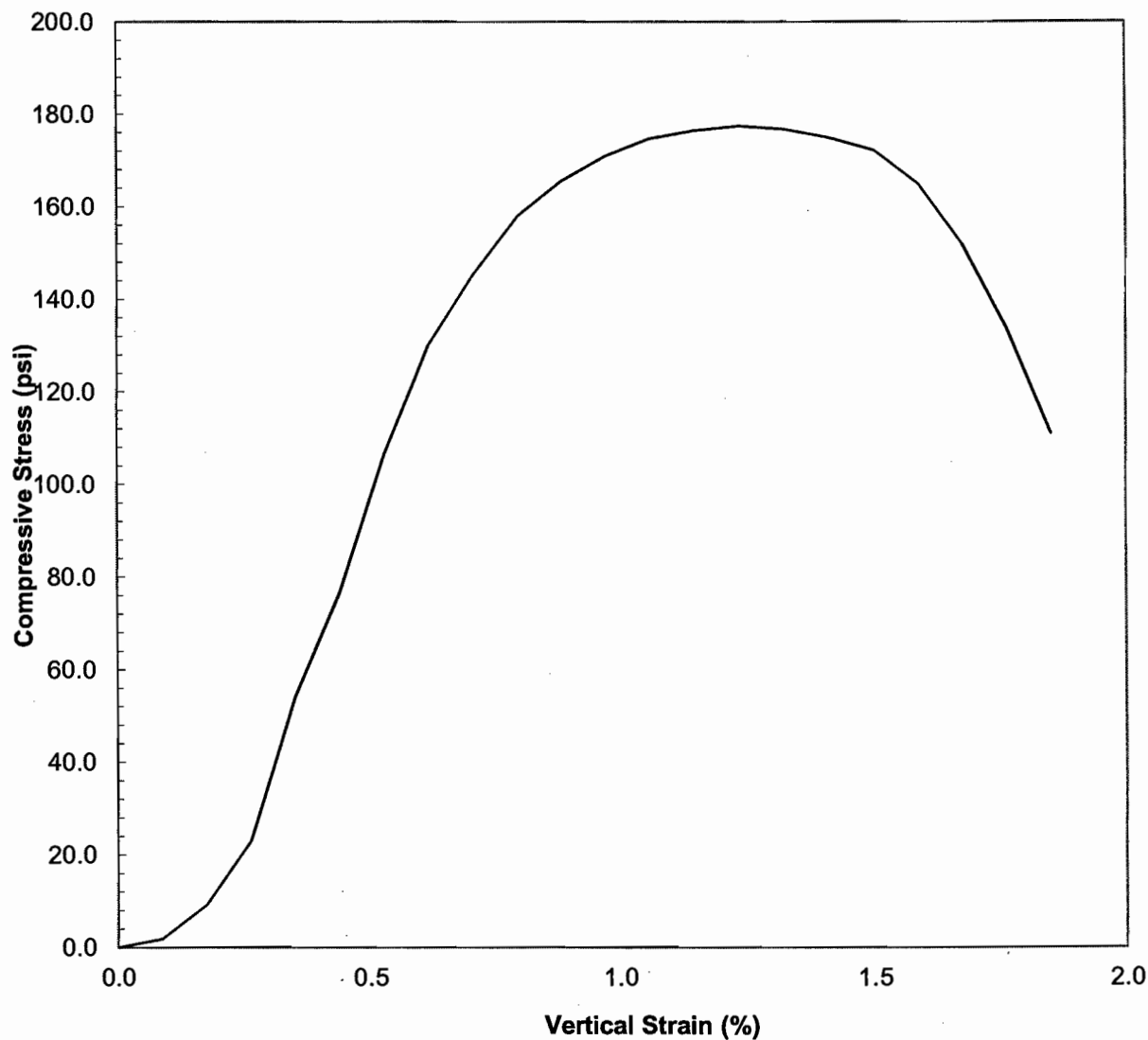
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 8-3, 9 day**

**Depth: N/A**

**ATL Sample No. AT1573S057**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

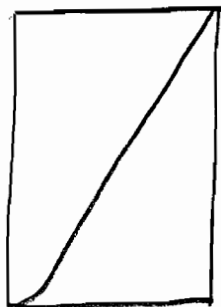
ATL Report No. AT1573SL-58-2-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 24-6

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	2/14/2011
Date of Test	2/21/2011
Age of Sample at Test Date	7 Days
Initial Dry Density (pcf)	67.2
Initial Water Content (%)	52.6
Unconfined Compressive Strength (psi)	107.4
Average Height (in.)	5.433
Average Diameter (in.)	2.997
Height-to-Diameter Ratio	1.81
Average Rate of Strain (%/min)	0.68
Strain at Failure (%)	1.0
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 2/22/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-58-2-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

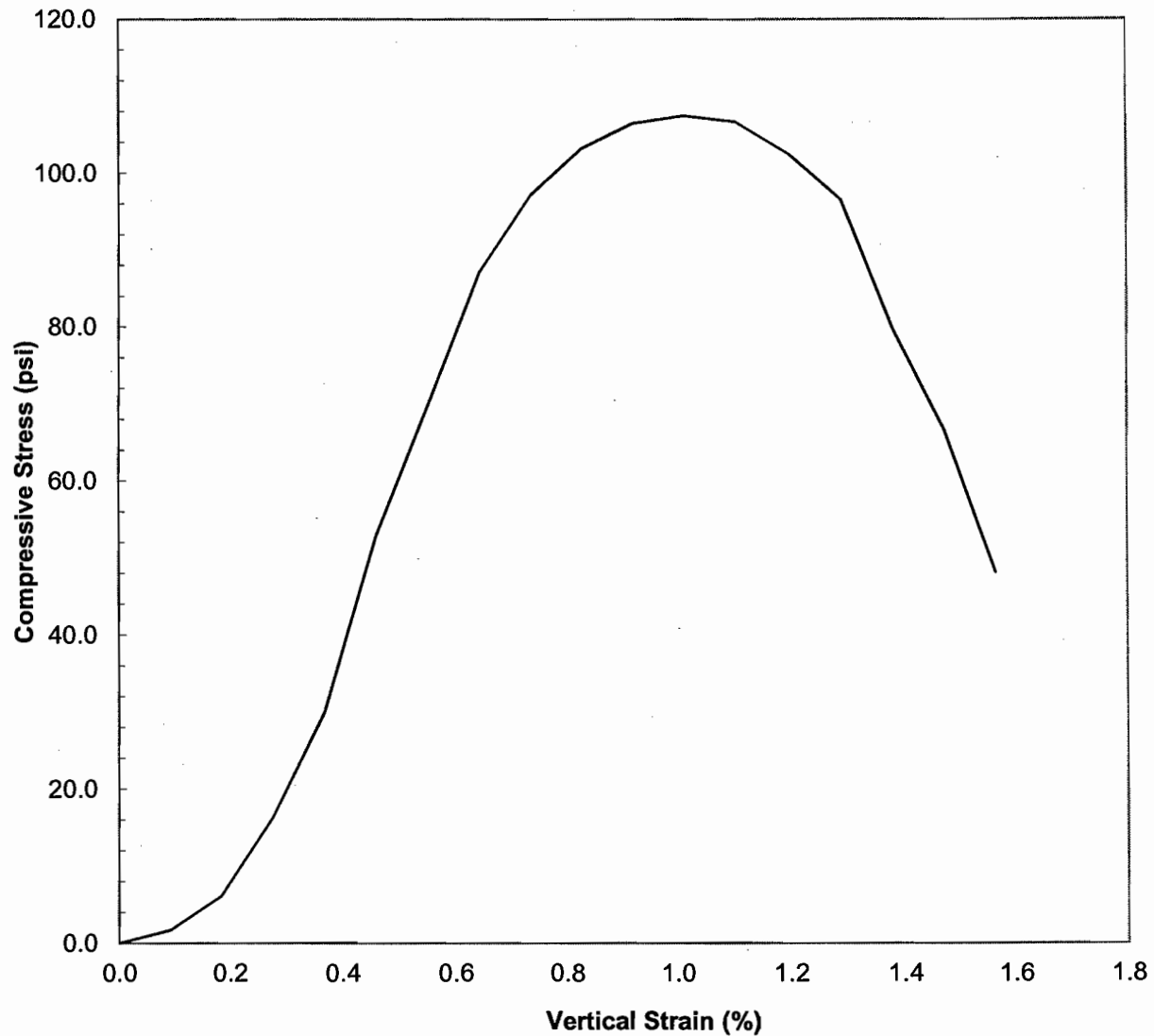
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 24-6, 7 day**

**Depth: N/A**

**ATL Sample No. AT1573S058**





# ATLANTIC TESTING LABORATORIES

**Albany**  
22 Corporate Drive  
Clifton Park, NY 12065  
518-383-9144 (T)  
518-383-9166 (F)

## TRANSMITTAL

February 23, 2011

AECOM  
40 British American Boulevard  
Latham, New York 12110

Attn: Mr. Scott Serviss

E/Mail: [scott.serviss@aecom.com](mailto:scott.serviss@aecom.com)

Re: Soil Laboratory Testing  
NGP Site  
Norwich, New York  
ATL Project No.: AT1573

Dear Mr. Serviss:

Enclosed are the following reports:

AT1573SL-59-2-11                      Unconfined Compressive Strength                      February 17, 2011

Please contact our office should you have any questions or if we may be of further service.

Sincerely,  
ATLANTIC TESTING LABORATORIES, Limited

Robert E. Field  
Laboratory Manager  
[bfield@atlantictesting.com](mailto:bfield@atlantictesting.com)

REF/nd

Enclosures





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

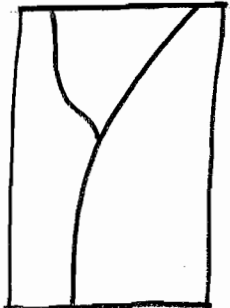
ATL Report No. AT1573SL-59-2-11

Client: \_\_\_\_\_ AECOM

Project: \_\_\_\_\_ NGP Site, Norwich, New York

Sample ID.: \_\_\_\_\_ 22-9

Sample Description: \_\_\_\_\_ Grout Column

Parameter	Results
Date Sample Cast	2/15/2011
Date of Test	2/22/2011
Age of Sample at Test Date	7 Days
Initial Dry Density (pcf)	81.3
Initial Water Content (%)	36.7
Unconfined Compressive Strength (psi)	132.0
Average Height (in.)	5.591
Average Diameter (in.)	2.993
Height-to-Diameter Ratio	1.87
Average Rate of Strain (%/min)	0.66
Strain at Failure (%)	1.3
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: \_\_\_\_\_ 

Date: \_\_\_\_\_ 2/23/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-59-2-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

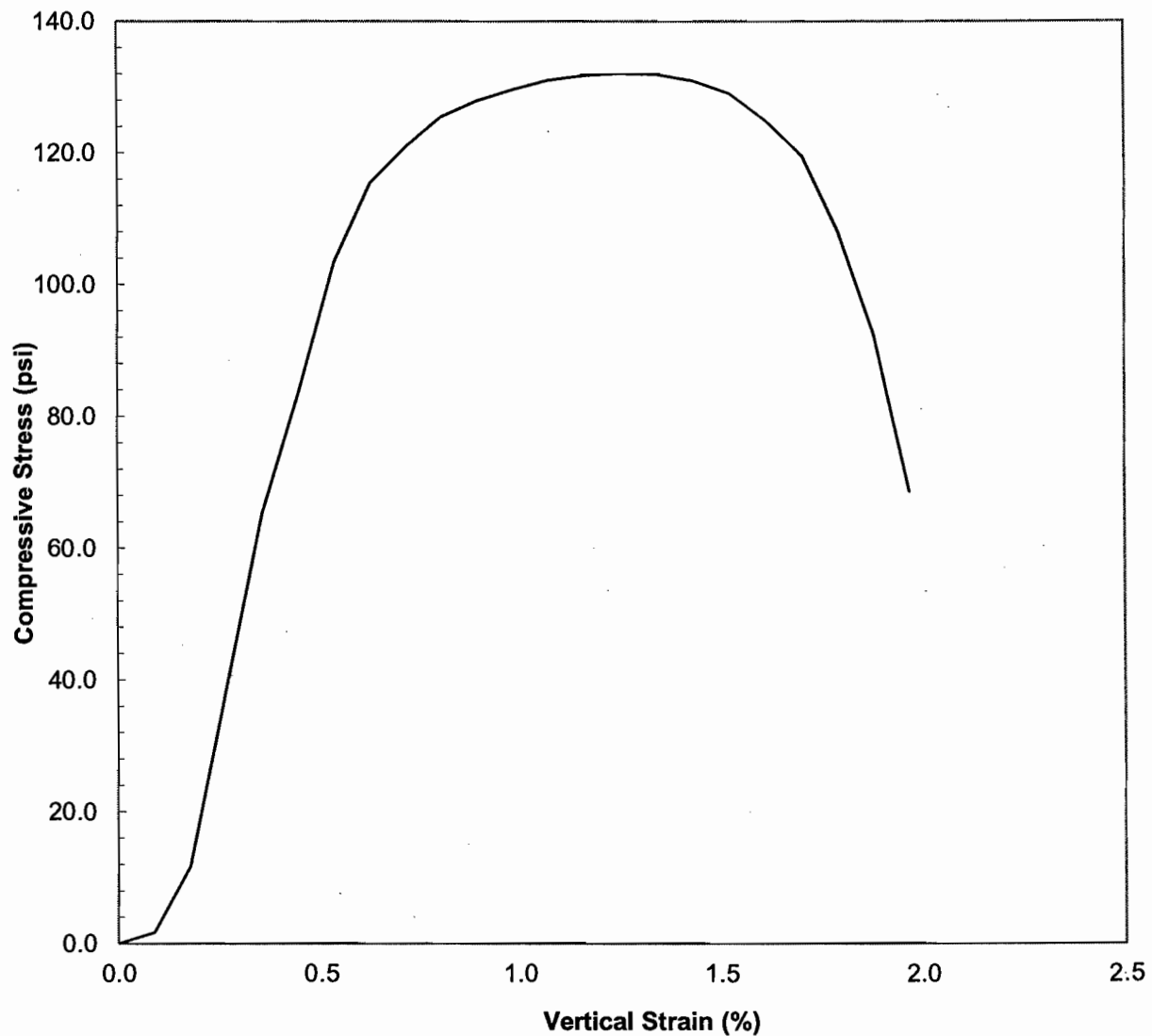
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 22-9, 7 day**

**Depth: N/A**

**ATL Sample No. AT1573S059**





# ATLANTIC TESTING LABORATORIES

**Albany**  
22 Corporate Drive  
Clifton Park, NY 12065  
518-383-9144 (T)  
518-383-9166 (F)

## TRANSMITTAL

March 2, 2011

AECOM  
40 British American Boulevard  
Latham, New York 12110

Attn: Mr. Scott Serviss

E/Mail: [scott.serviss@aecom.com](mailto:scott.serviss@aecom.com)

Re: Soil Laboratory Testing  
NGP Site  
Norwich, New York  
ATL Project No.: AT1573

Dear Mr. Serviss:

Enclosed are the following reports:

AT1573SL-60-2-11	Unconfined Compressive Strength	February 23, 2011
AT1573SL-61-2-11	Unconfined Compressive Strength	February 23, 2011
AT1573SL-62-2-11	Unconfined Compressive Strength	February 23, 2011
AT1573SL-63-2-11	Unconfined Compressive Strength	February 23, 2011
AT1573SL-64-2-11	Unconfined Compressive Strength	February 23, 2011
AT1573SL-65-2-11	Unconfined Compressive Strength	February 23, 2011
AT1573SL-66-2-11	Unconfined Compressive Strength	February 23, 2011
AT1573SL-67-2-11	Unconfined Compressive Strength	February 23, 2011

Please contact our office should you have any questions or if we may be of further service.

Sincerely,  
ATLANTIC TESTING LABORATORIES, Limited

Robert E. Field  
Laboratory Manager  
[bfield@atlantictesting.com](mailto:bfield@atlantictesting.com)

REF/nd

Enclosures



# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

ATL Report No. AT1573SL-60-2-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 20-10

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	2/16/2011
Date of Test	2/24/2011
Age of Sample at Test Date	8 Days
Initial Dry Density (pcf)	73.3
Initial Water Content (%)	45.4
Unconfined Compressive Strength (psi)	209.5
Average Height (in.)	5.394
Average Diameter (in.)	2.995
Height-to-Diameter Ratio	1.80
Average Rate of Strain (%/min)	0.69
Strain at Failure (%)	1.1
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by:

Date: 3/2/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-60-2-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

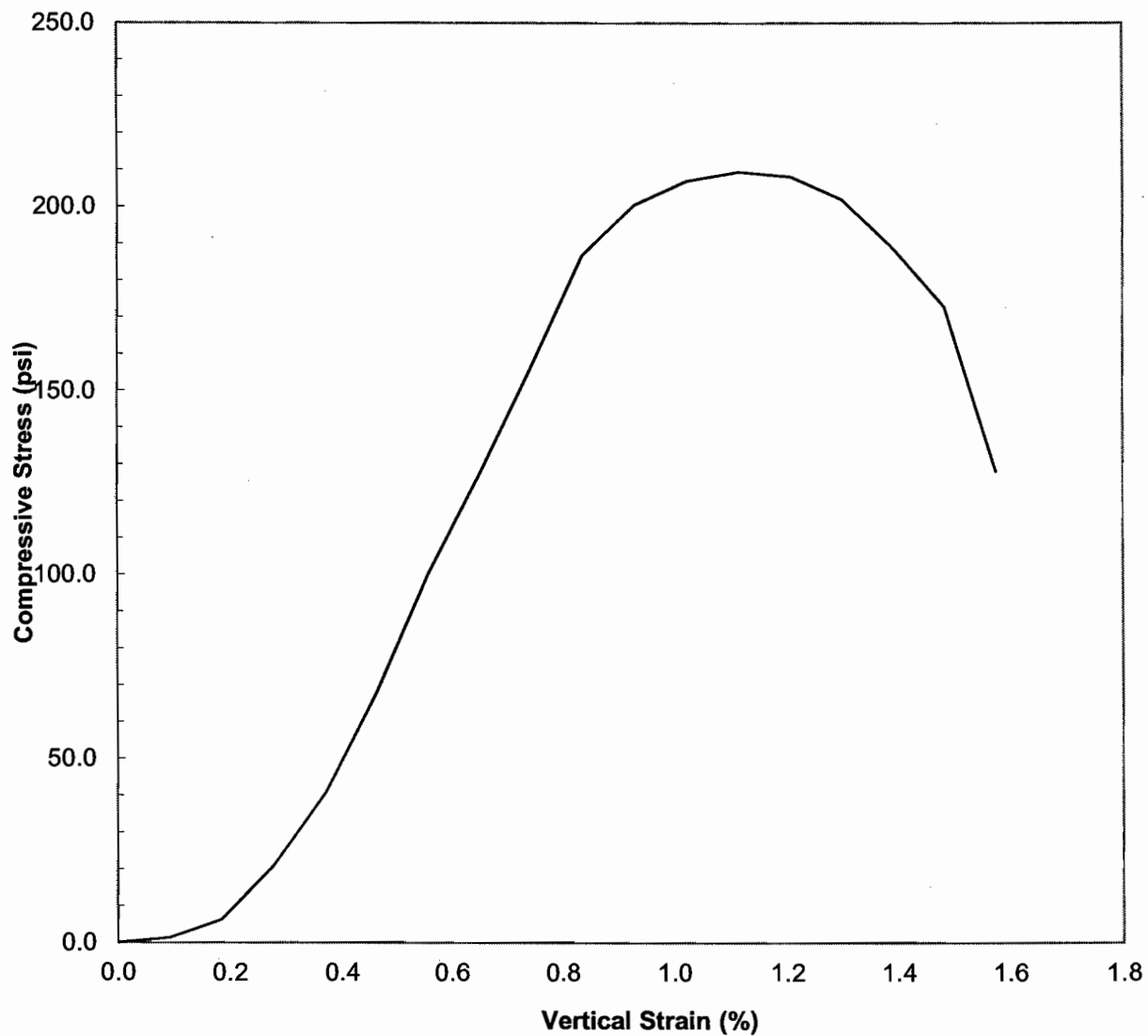
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 20-10, 8 day**

**Depth: N/A**

**ATL Sample No. AT1573S060**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

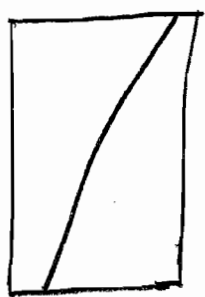
ATL Report No. AT1573SL-61-2-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 18-9

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	2/16/2011
Date of Test	2/24/2011
Age of Sample at Test Date	8 Days
Initial Dry Density (pcf)	74.7
Initial Water Content (%)	43.7
Unconfined Compressive Strength (psi)	268.5
Average Height (in.)	5.591
Average Diameter (in.)	2.991
Height-to-Diameter Ratio	1.87
Average Rate of Strain (%/min)	0.66
Strain at Failure (%)	1.3
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 3/2/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-61-2-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

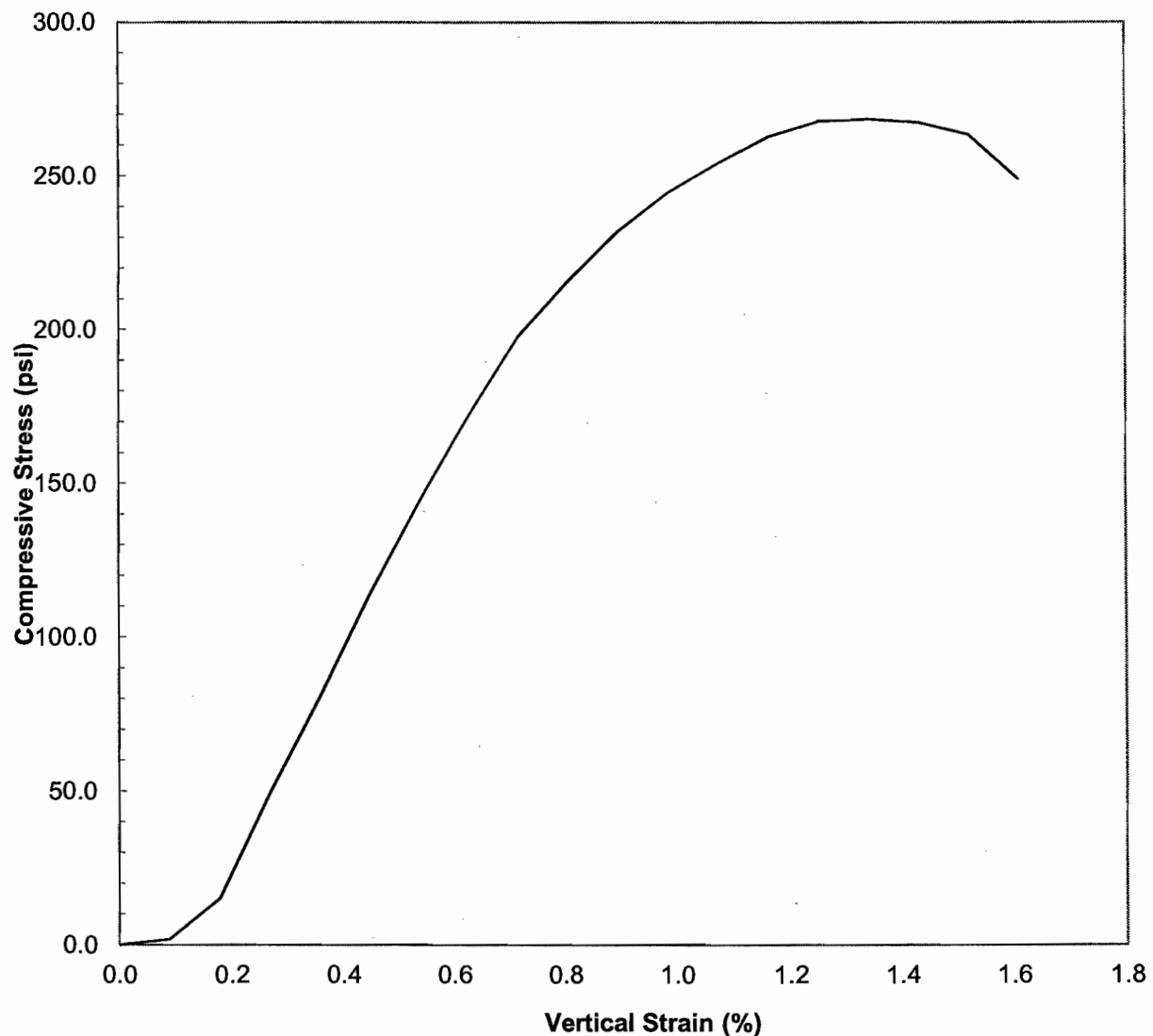
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 18-9, 8 day**

**Depth: N/A**

**ATL Sample No. AT1573S061**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

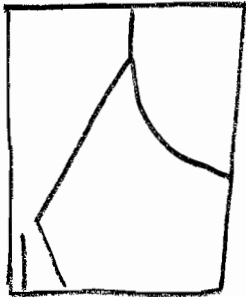
ATL Report No. AT1573SL-62-2-11

Client: \_\_\_\_\_ AECOM

Project: \_\_\_\_\_ NGP Site, Norwich, New York

Sample ID.: \_\_\_\_\_ 16-10

Sample Description: \_\_\_\_\_ Grout Column

Parameter	Results
Date Sample Cast	2/17/2011
Date of Test	2/24/2011
Age of Sample at Test Date	7 Days
Initial Dry Density (pcf)	80.8
Initial Water Content (%)	37.5
Unconfined Compressive Strength (psi)	195.7
Average Height (in.)	5.512
Average Diameter (in.)	2.995
Height-to-Diameter Ratio	1.84
Average Rate of Strain (%/min)	0.67
Strain at Failure (%)	1.3
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: REF

Date: 3/2/11





# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-62-2-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

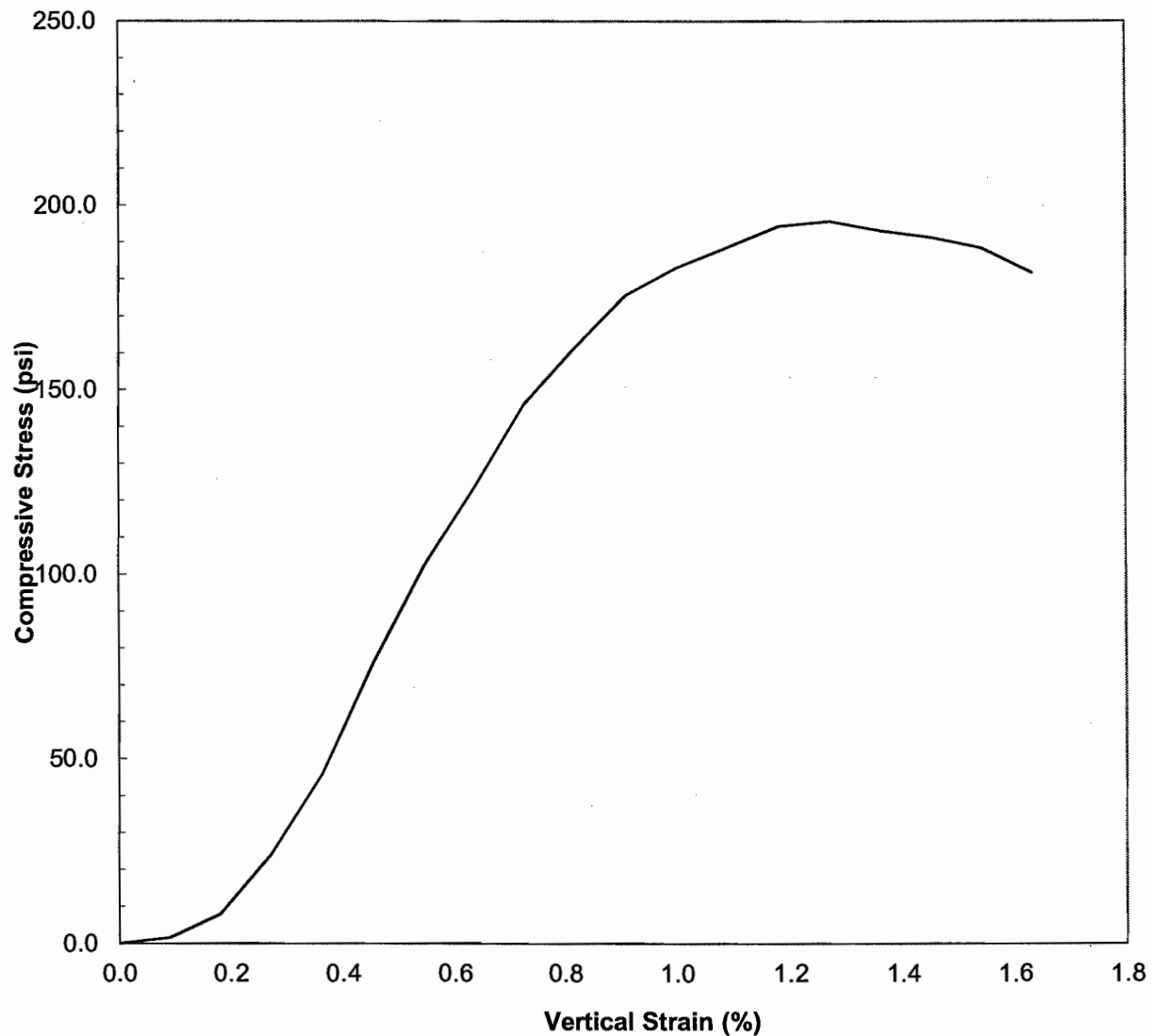
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 16-10, 7 day**

**Depth: N/A**

**ATL Sample No. AT1573S062**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

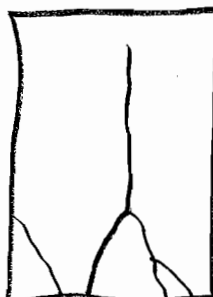
ATL Report No. AT1573SL-63-2-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 15-9

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	2/18/2011
Date of Test	2/28/2011
Age of Sample at Test Date	10 Days
Initial Dry Density (pcf)	78.7
Initial Water Content (%)	38.4
Unconfined Compressive Strength (psi)	187.8
Average Height (in.)	5.512
Average Diameter (in.)	3.000
Height-to-Diameter Ratio	1.84
Average Rate of Strain (%/min)	0.67
Strain at Failure (%)	1.3
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 3/2/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-63-2-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

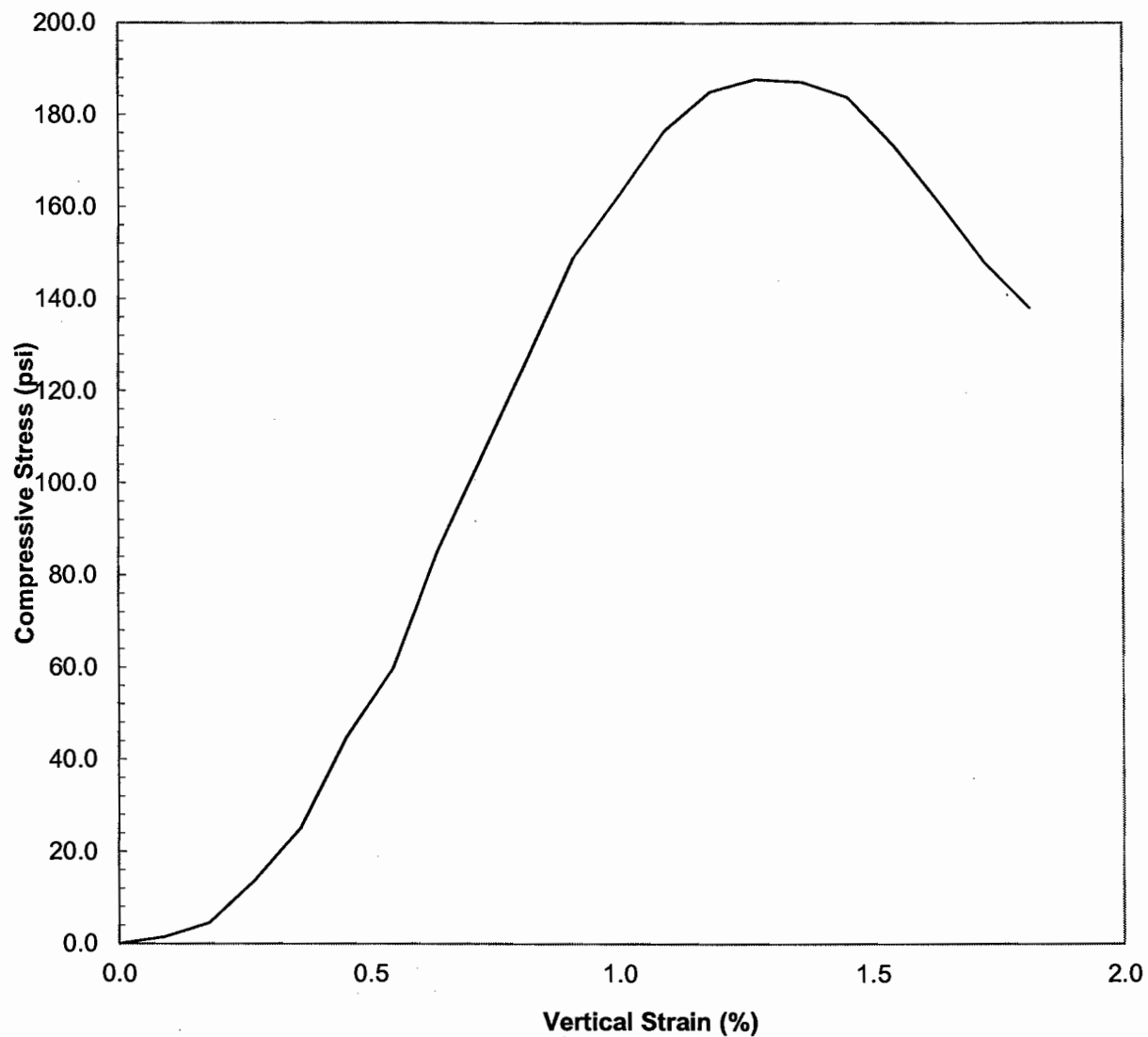
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 15-9, 10 day**

**Depth: N/A**

**ATL Sample No. AT1573S063**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166


ATL Report No. AT1573SL-64-2-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 13-9

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	2/18/2011
Date of Test	2/28/2011
Age of Sample at Test Date	10 Days
Initial Dry Density (pcf)	73.9
Initial Water Content (%)	43.7
Unconfined Compressive Strength (psi)	101.9
Average Height (in.)	5.433
Average Diameter (in.)	3.008
Height-to-Diameter Ratio	1.81
Average Rate of Strain (%/min)	0.68
Strain at Failure (%)	1.5
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 3/2/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-64-2-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

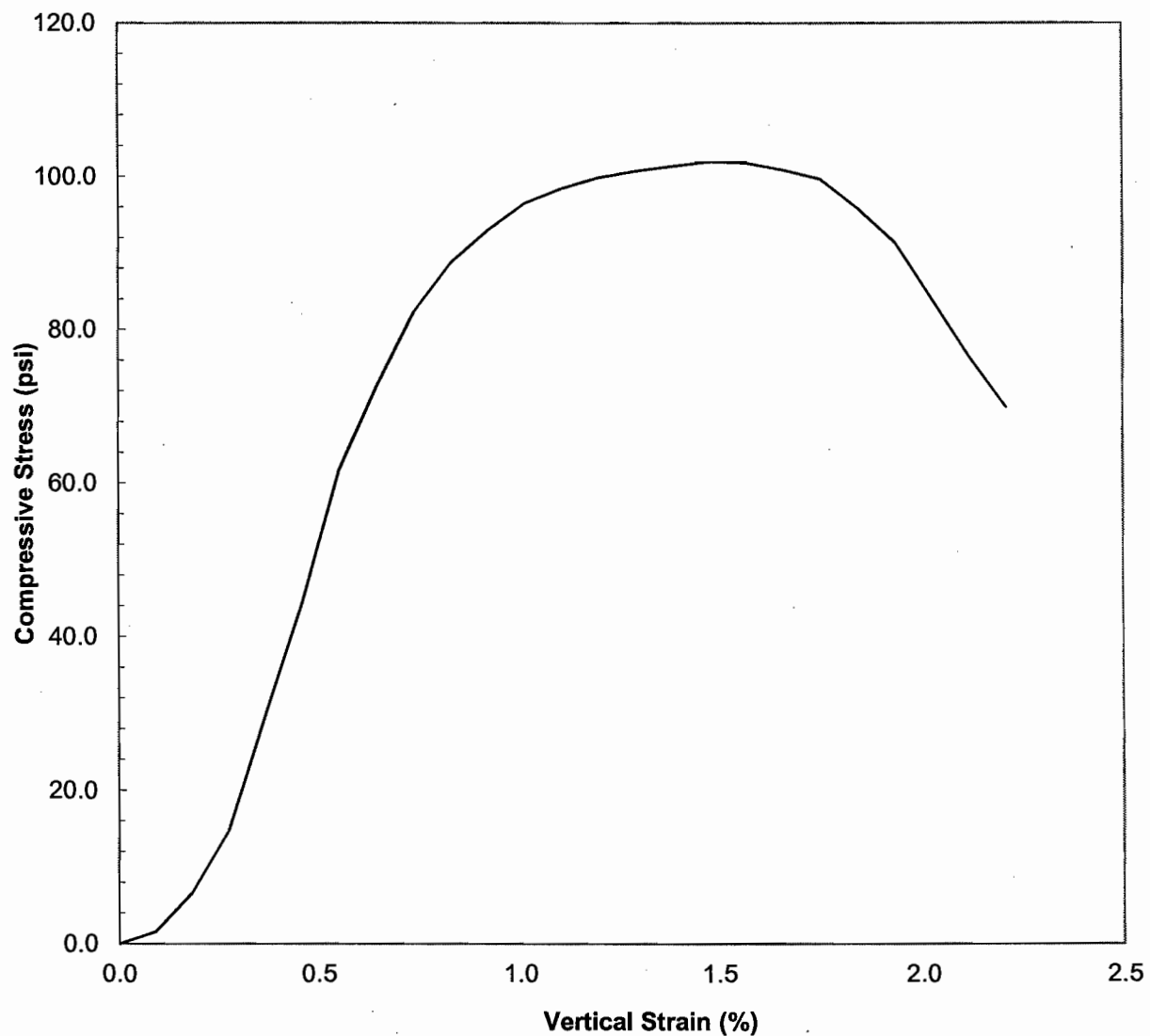
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 13-9, 10 day**

**Depth: N/A**

**ATL Sample No. AT1573S064**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

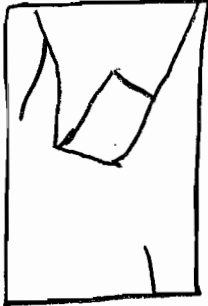
ATL Report No. AT1573SL-65-2-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 12-10

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	2/19/2011
Date of Test	2/28/2011
Age of Sample at Test Date	9 Days
Initial Dry Density (pcf)	73.6
Initial Water Content (%)	44.3
Unconfined Compressive Strength (psi)	171.6
Average Height (in.)	5.591
Average Diameter (in.)	3.004
Height-to-Diameter Ratio	1.86
Average Rate of Strain (%/min)	0.66
Strain at Failure (%)	1.3
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 3/2/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-65-2-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

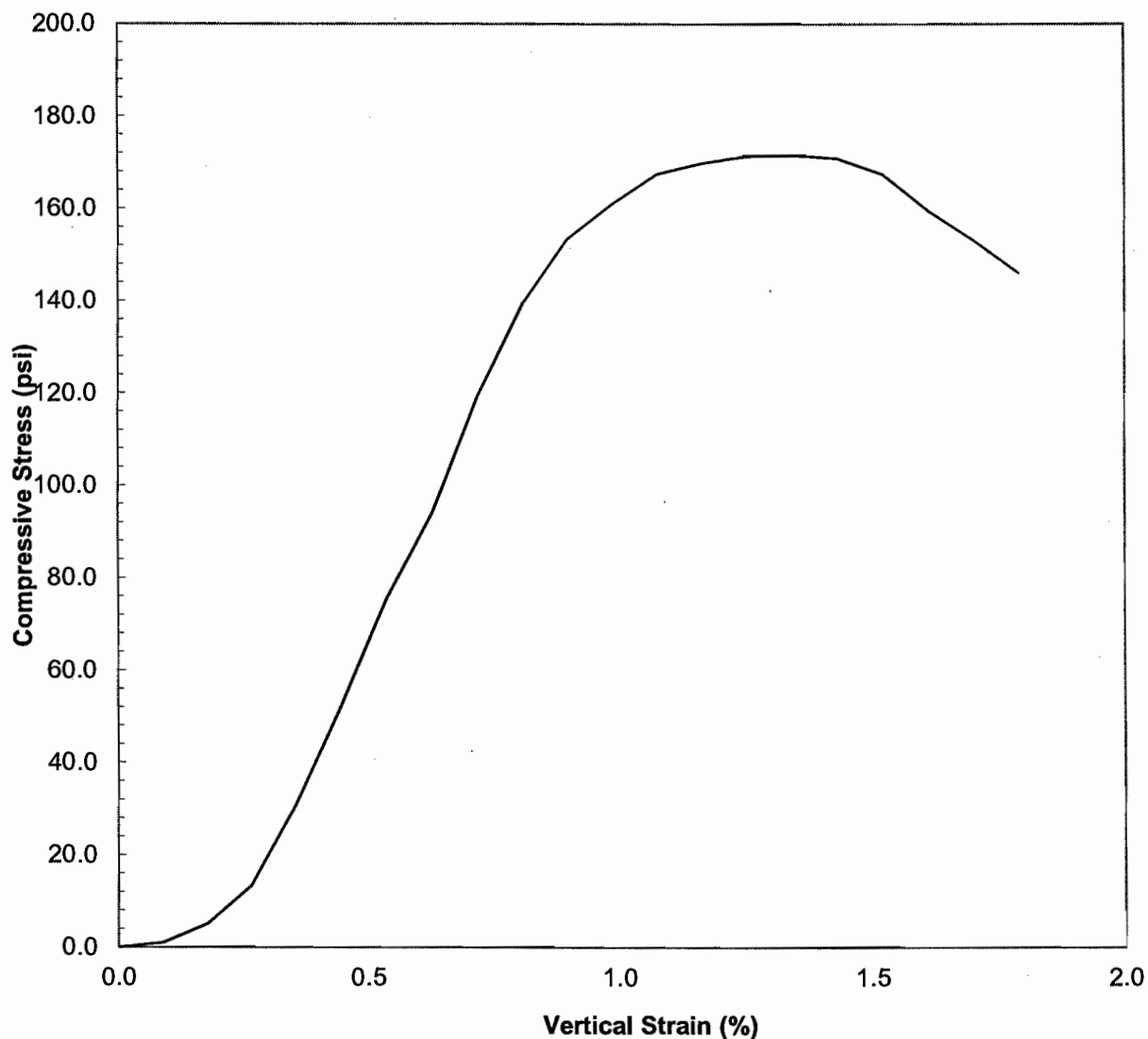
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 12-10, 9 day**

**Depth: N/A**

**ATL Sample No. AT1573S065**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

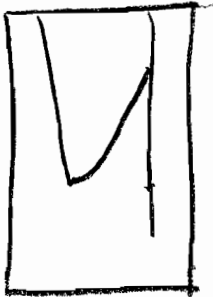
ATL Report No. AT1573SL-66-2-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 10-5

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	2/21/2011
Date of Test	2/28/2011
Age of Sample at Test Date	7 Days
Initial Dry Density (pcf)	77.2
Initial Water Content (%)	41.7
Unconfined Compressive Strength (psi)	91.5
Average Height (in.)	5.472
Average Diameter (in.)	2.993
Height-to-Diameter Ratio	1.83
Average Rate of Strain (%/min)	0.68
Strain at Failure (%)	1.4
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 3/2/11





# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-66-2-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

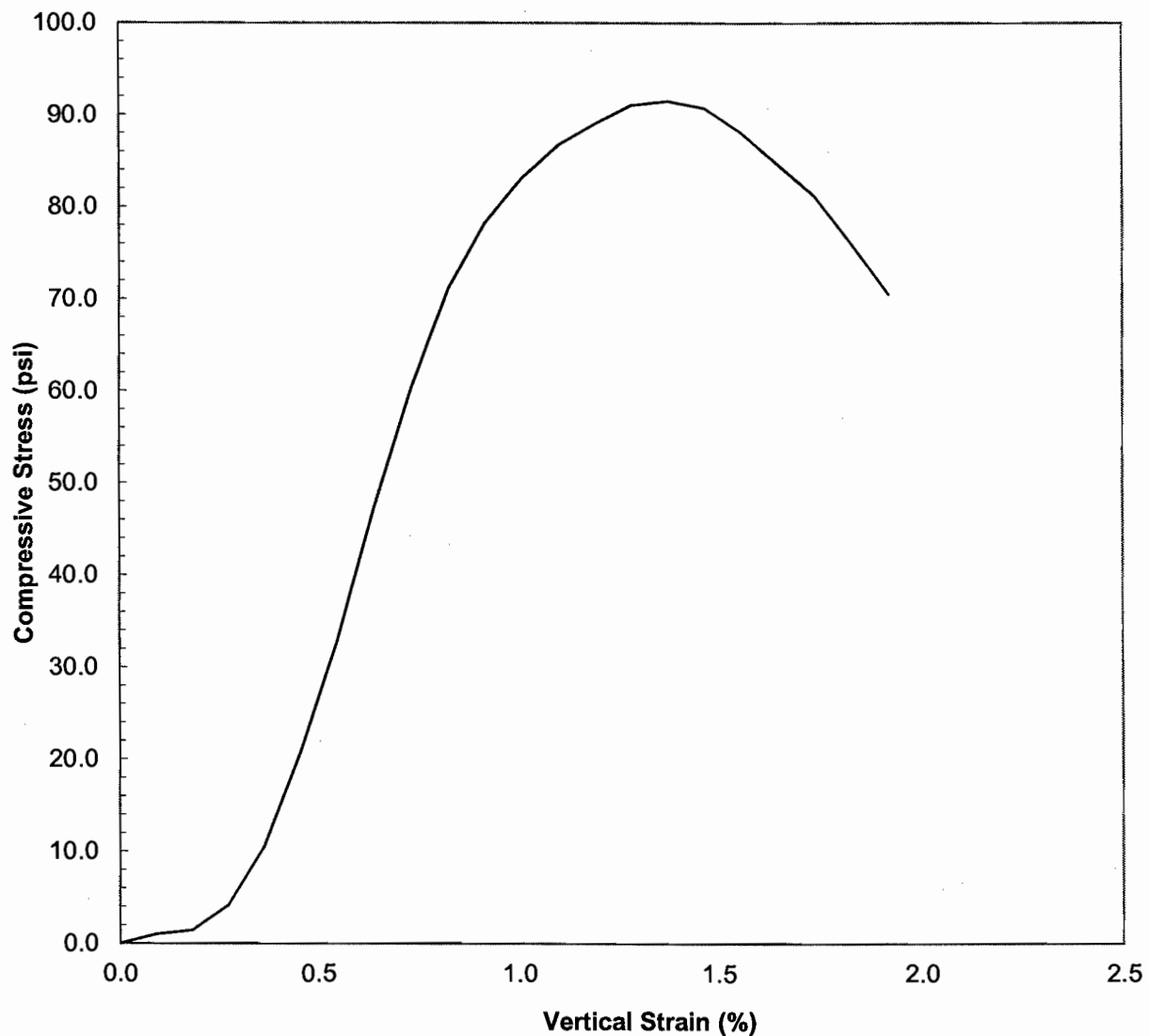
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 10-5, 7 day**

**Depth: N/A**

**ATL Sample No. AT1573S066**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166


ATL Report No. AT1573SL-67-2-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 8-6

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	2/21/2011
Date of Test	2/28/2011
Age of Sample at Test Date	7 Days
Initial Dry Density (pcf)	83.3
Initial Water Content (%)	36.1
Unconfined Compressive Strength (psi)	175.1
Average Height (in.)	5.591
Average Diameter (in.)	2.997
Height-to-Diameter Ratio	1.87
Average Rate of Strain (%/min)	0.66
Strain at Failure (%)	1.6
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 3/2/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-67-2-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

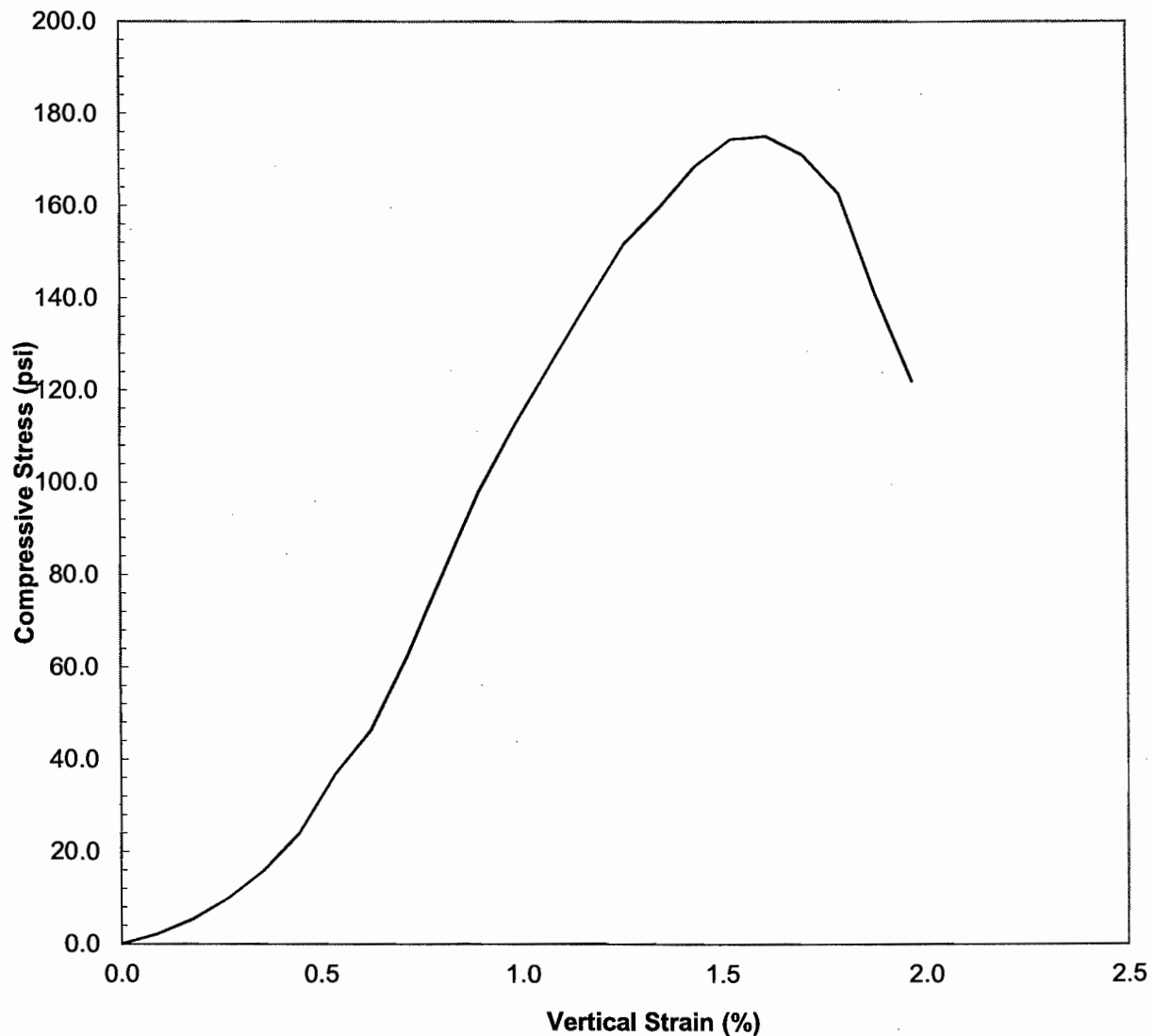
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 8-6, 7 day**

**Depth: N/A**

**ATL Sample No. AT1573S067**





# ATLANTIC TESTING LABORATORIES

**Albany**  
22 Corporate Drive  
Clifton Park, NY 12065  
518-383-9144 (T)  
518-383-9166 (F)

## TRANSMITTAL

March 3, 2011

AECOM  
40 British American Boulevard  
Latham, New York 12110

Attn: Mr. Scott Serviss

E/Mail: [scott.serviss@aecom.com](mailto:scott.serviss@aecom.com)

Re: Soil Laboratory Testing  
NGP Site  
Norwich, New York  
ATL Project No.: AT1573

Dear Mr. Serviss:

Enclosed are the following reports:

AT1573SL-68-3-11	Unconfined Compressive Strength	March 3, 2011
AT1573SL-69-3-11	Unconfined Compressive Strength	March 3, 2011
AT1573SL-41A-12-10	Hydraulic Conductivity	February 1, 2011
AT1573SL-42A-1-11	Hydraulic Conductivity	February 1, 2011
AT1573SL-43A-1-11	Hydraulic Conductivity	February 1, 2011
AT1573SL-44A-1-11	Hydraulic Conductivity	February 1, 2011
AT1573SL-45A-1-11	Hydraulic Conductivity	February 1, 2011

Please contact our office should you have any questions or if we may be of further service.

Sincerely,  
ATLANTIC TESTING LABORATORIES, Limited

Robert E. Field  
Laboratory Manager  
[bfield@atlantictesting.com](mailto:bfield@atlantictesting.com)

REF/nd

Enclosures



# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166


ATL Report No. AT1573SL-68-3-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 8-8

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	2/22/2011
Date of Test	3/2/2011
Age of Sample at Test Date	8 Days
Initial Dry Density (pcf)	79.3
Initial Water Content (%)	38.6
Unconfined Compressive Strength (psi)	195.8
Average Height (in.)	5.354
Average Diameter (in.)	3.000
Height-to-Diameter Ratio	1.78
Average Rate of Strain (%/min)	0.69
Strain at Failure (%)	1.1
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 3/3/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-68-3-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

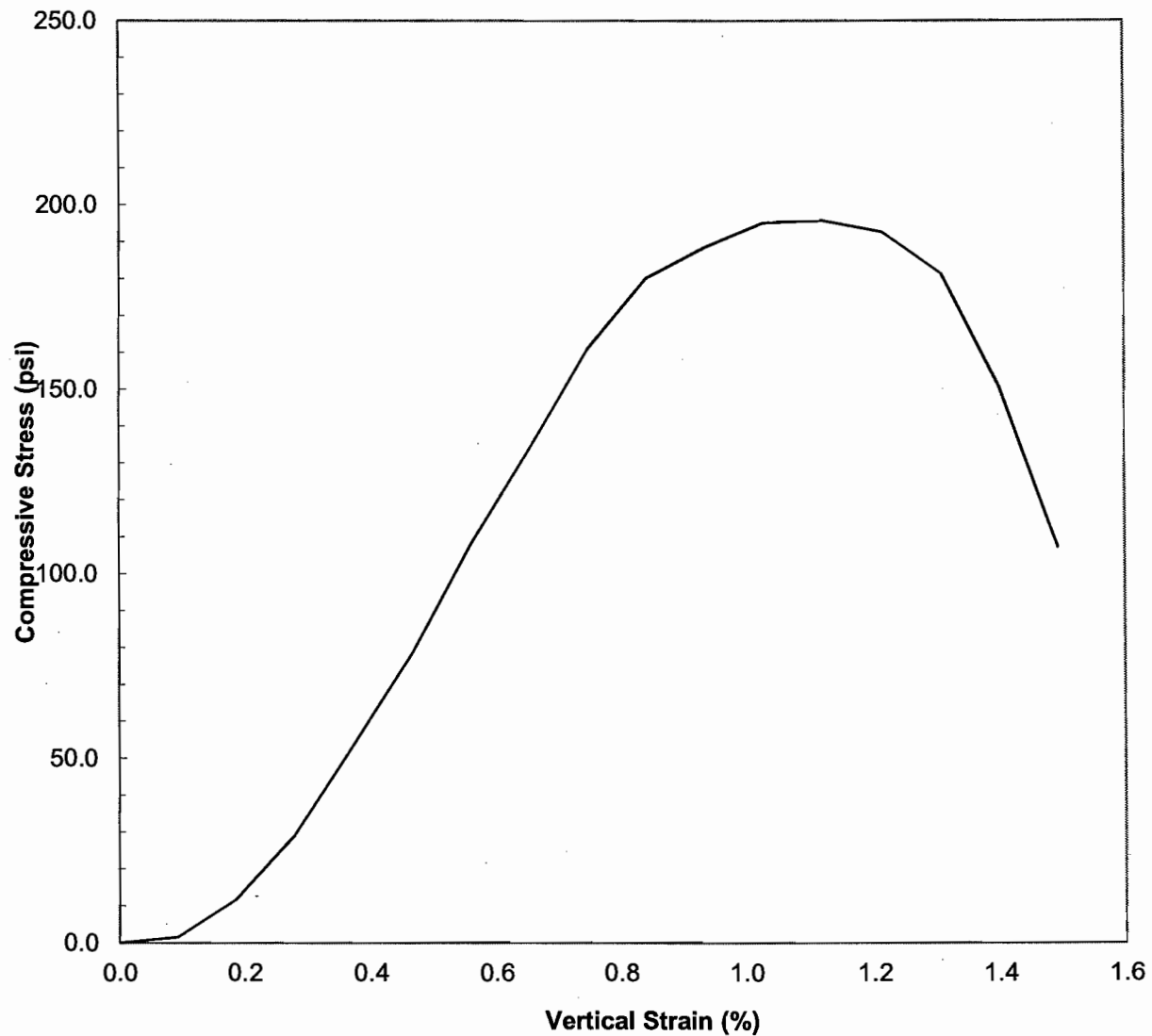
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 8-8, 8 day**

**Depth: N/A**

**ATL Sample No. AT1573S068**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

ATL Report No. AT1573SL-69-3-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 10-10

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	2/23/2011
Date of Test	3/2/2011
Age of Sample at Test Date	7 Days
Initial Dry Density (pcf)	78.8
Initial Water Content (%)	39.7
Unconfined Compressive Strength (psi)	83.1
Average Height (in.)	5.433
Average Diameter (in.)	3.000
Height-to-Diameter Ratio	1.81
Average Rate of Strain (%/min)	0.68
Strain at Failure (%)	1.1
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by:

Date: 3/3/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-69-3-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

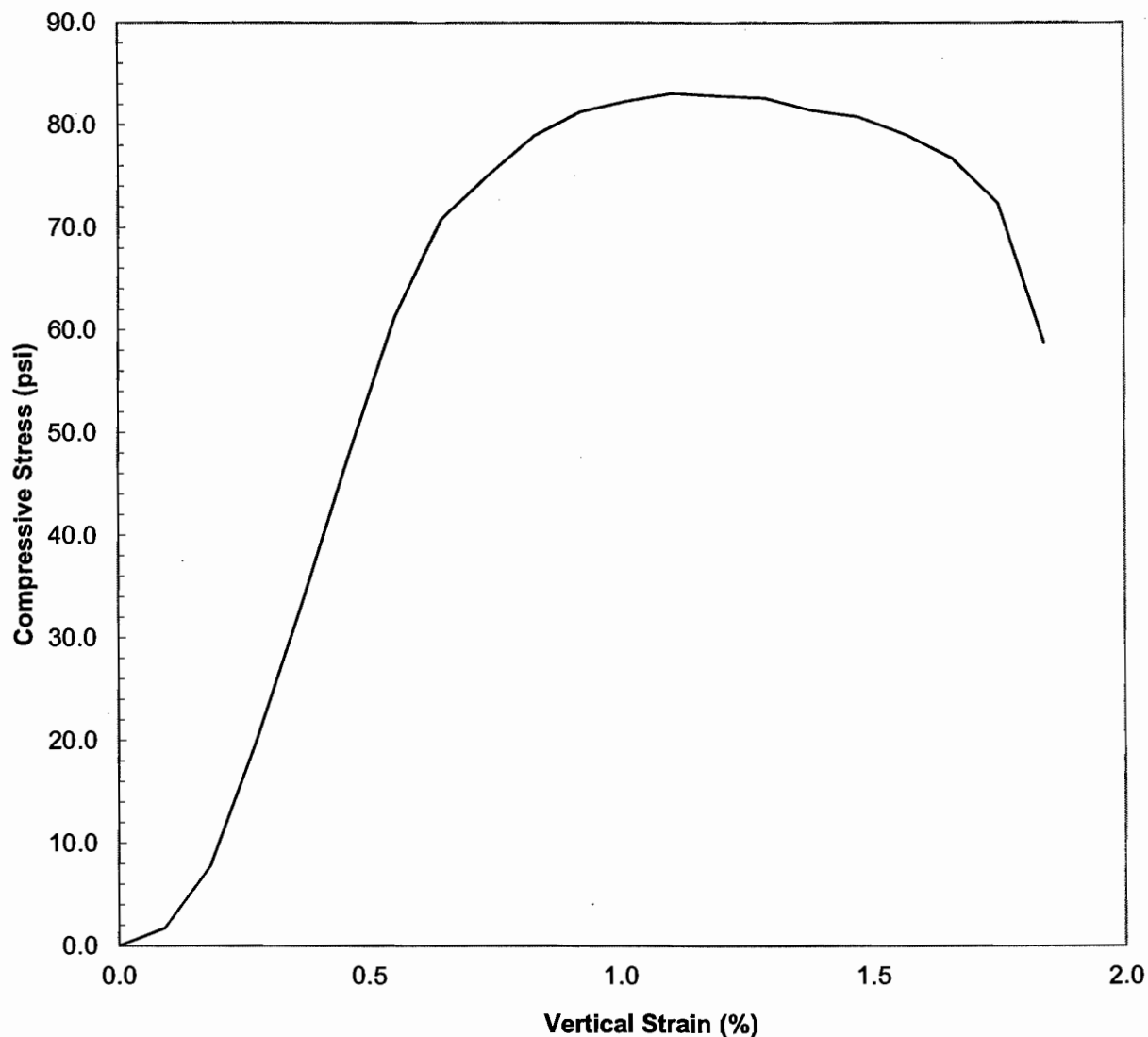
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 10-10, 7 day**

**Depth: N/A**

**ATL Sample No. AT1573S069**







# ATLANTIC TESTING LABORATORIES

**Albany**  
22 Corporate Drive  
Clifton Park, NY 12065  
518-383-9144 (T)  
518-383-9166 (F)

## TRANSMITTAL

March 8, 2011

AECOM  
40 British American Boulevard  
Latham, New York 12110

Attn: Mr. Scott Serviss

E/Mail: [scott.serviss@aecom.com](mailto:scott.serviss@aecom.com)

Re: Soil Laboratory Testing  
NGP Site  
Norwich, New York  
ATL Project No.: AT1573

Dear Mr. Serviss:

Enclosed are the following reports:

AT1573SL-70-3-11	Unconfined Compressive Strength	March 2, 2011
AT1573SL-71-3-11	Unconfined Compressive Strength	March 2, 2011
AT1573SL-72-3-11	Unconfined Compressive Strength	March 2, 2011

Please contact our office should you have any questions or if we may be of further service.

Sincerely,  
ATLANTIC TESTING LABORATORIES, Limited

Robert E. Field  
Laboratory Manager  
[bfield@atlantictesting.com](mailto:bfield@atlantictesting.com)

REF/nd

Enclosures



# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

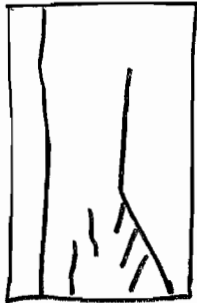
ATL Report No. AT1573SL-70-3-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 29-10

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	2/24/2011
Date of Test	3/3/2011
Age of Sample at Test Date	7 Days
Initial Dry Density (pcf)	74.0
Initial Water Content (%)	46.2
Unconfined Compressive Strength (psi)	266.3
Average Height (in.)	5.512
Average Diameter (in.)	2.993
Height-to-Diameter Ratio	1.84
Average Rate of Strain (%/min)	0.67
Strain at Failure (%)	1.5
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 3/8/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-70-3-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

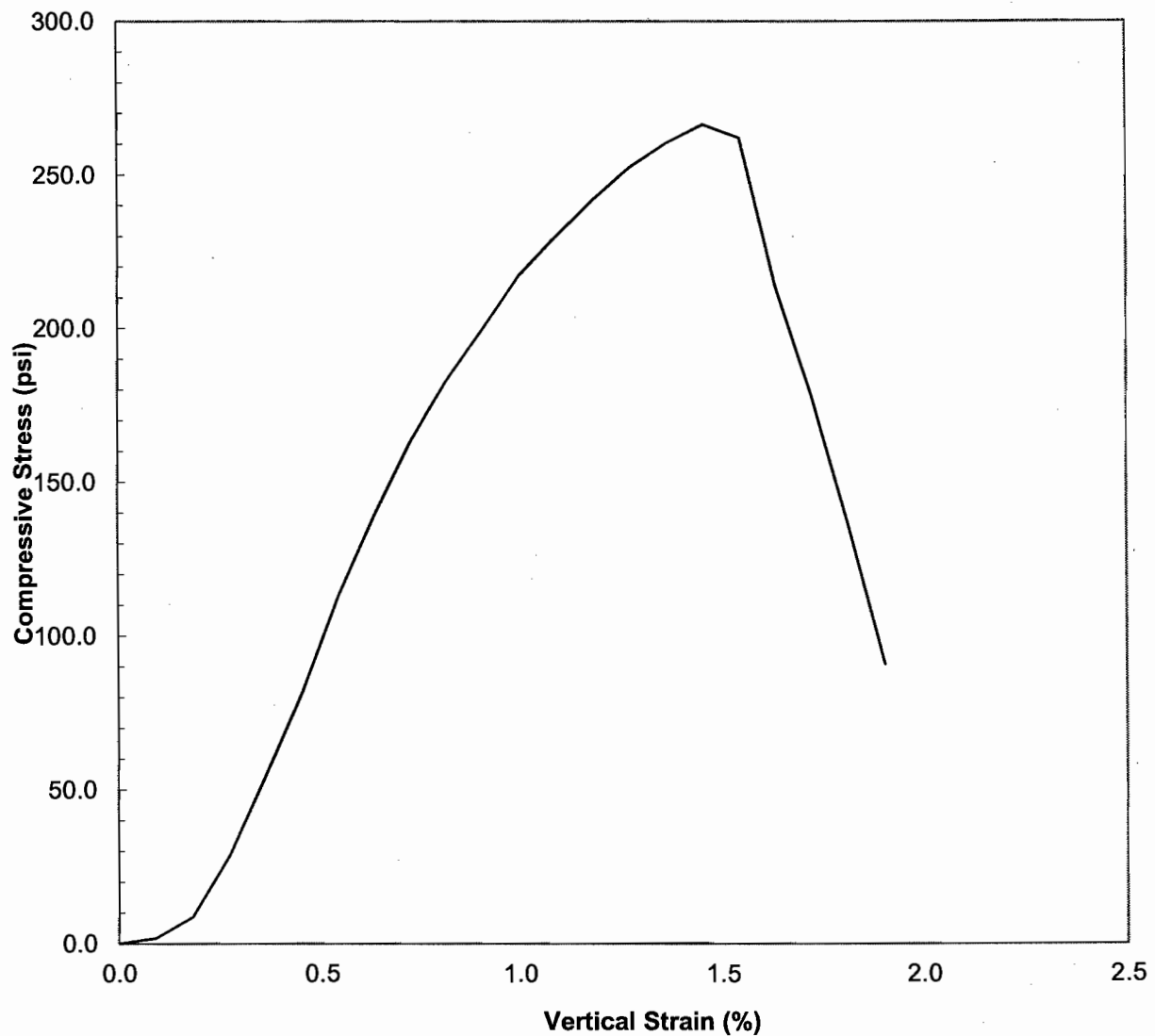
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 29-10, 7 day**

**Depth: N/A**

**ATL Sample No. AT1573S070**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

ATL Report No. AT1573SL-71-3-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 26-11

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	2/26/2011
Date of Test	3/7/2011
Age of Sample at Test Date	9 Days
Initial Dry Density (pcf)	72.5
Initial Water Content (%)	47.7
Unconfined Compressive Strength (psi)	120.9
Average Height (in.)	5.669
Average Diameter (in.)	2.992
Height-to-Diameter Ratio	1.89
Average Rate of Strain (%/min)	0.65
Strain at Failure (%)	1.2
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by:

Date: 3/8/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-71-3-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

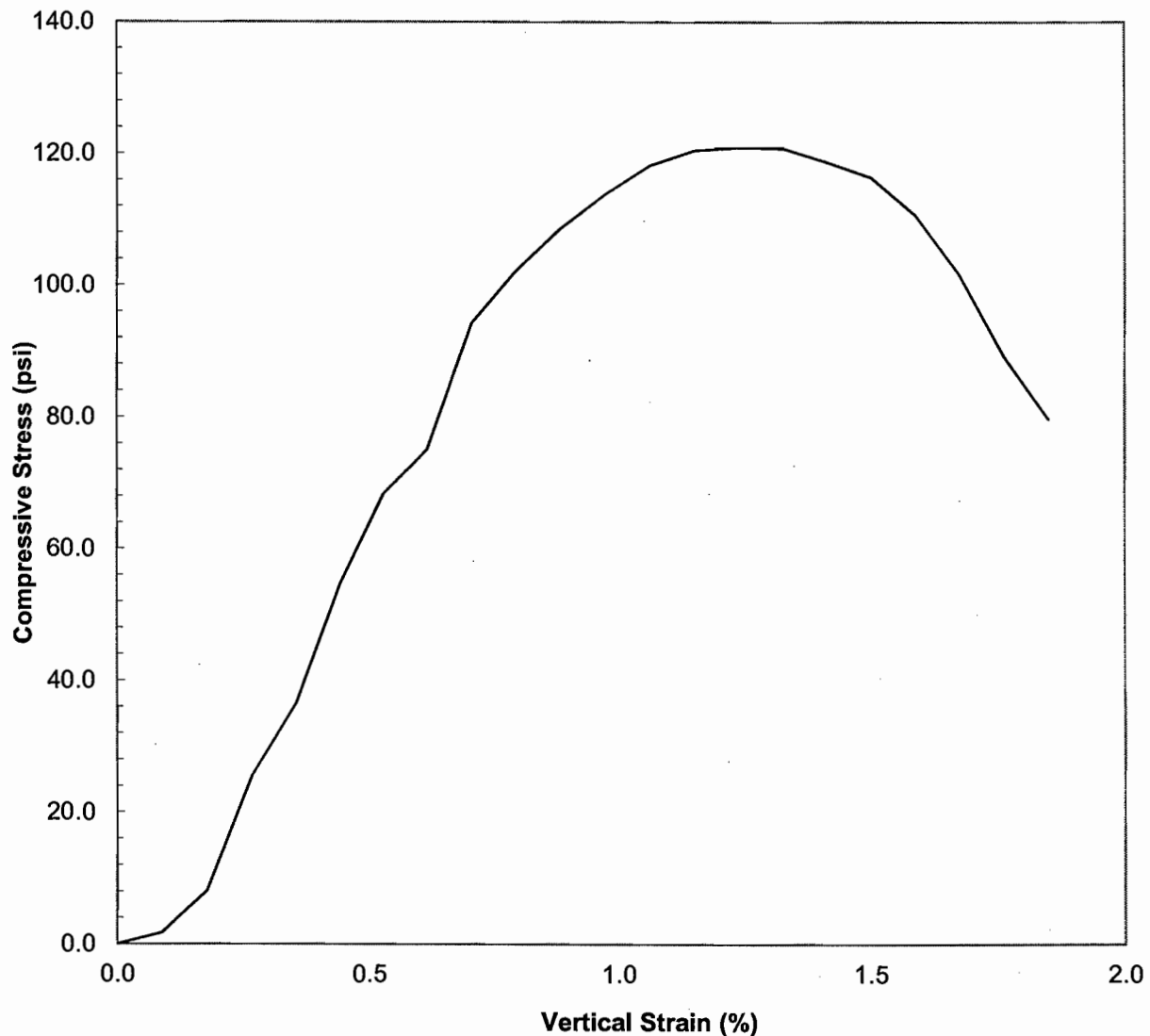
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 26-11, 9 day**

**Depth: N/A**

**ATL Sample No. AT1573S071**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166


ATL Report No. AT1573SL-72-3-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 24-12

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	2/28/2011
Date of Test	3/7/2011
Age of Sample at Test Date	7 Days
Initial Dry Density (pcf)	78.1
Initial Water Content (%)	40.9
Unconfined Compressive Strength (psi)	221.6
Average Height (in.)	5.709
Average Diameter (in.)	2.991
Height-to-Diameter Ratio	1.91
Average Rate of Strain (%/min)	0.65
Strain at Failure (%)	1.5
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 3/8/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-72-3-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

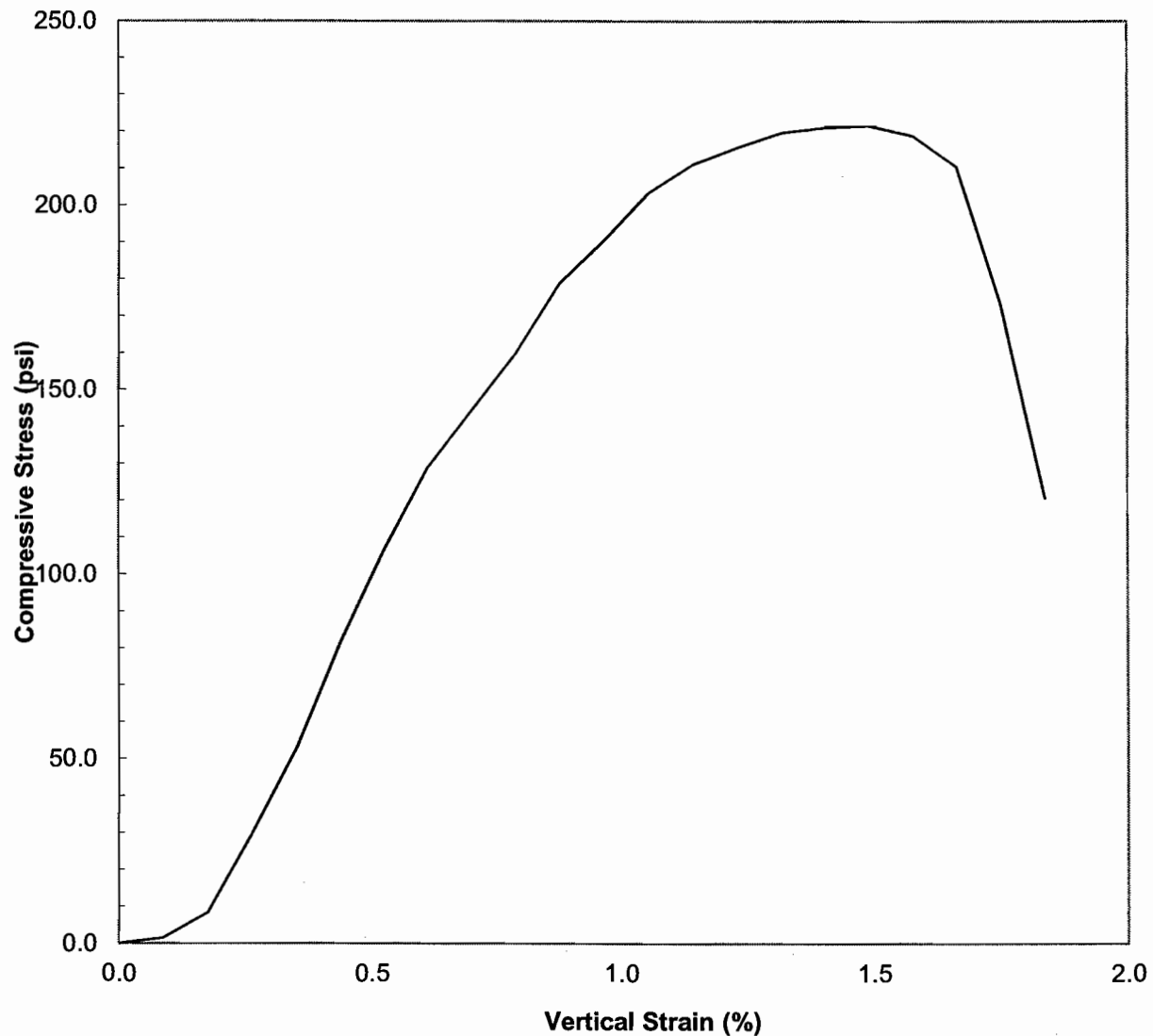
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 24-12, 7 day**

**Depth: N/A**

**ATL Sample No. AT1573S072**





# ATLANTIC TESTING LABORATORIES

**Albany**  
22 Corporate Drive  
Clifton Park, NY 12065  
518-383-9144 (T)  
518-383-9166 (F)

## TRANSMITTAL

March 11, 2011

AECOM  
40 British American Boulevard  
Latham, New York 12110

Attn: Mr. Scott Serviss

E/Mail: [scott.serviss@aecom.com](mailto:scott.serviss@aecom.com)

Re: Soil Laboratory Testing  
NGP Site  
Norwich, New York  
ATL Project No.: AT1573

Dear Mr. Serviss:

Enclosed are the following reports:

AT1573SL-73-3-11	Unconfined Compressive Strength	March 3, 2011
AT1573SL-74-3-11	Unconfined Compressive Strength	March 3, 2011
AT1573SL-75-3-11	Unconfined Compressive Strength	March 3, 2011
AT1573SL-76-3-11	Unconfined Compressive Strength	March 3, 2011
AT1573SL-77-3-11	Unconfined Compressive Strength	March 3, 2011
AT1573SL-46A-2-11	Hydraulic Conductivity	March 10, 2011
AT1573SL-47A-2-11	Hydraulic Conductivity	March 10, 2011
AT1573SL-48A-2-11	Hydraulic Conductivity	March 10, 2011
AT1573SL-49A-2-11	Hydraulic Conductivity	March 10, 2011
AT1573SL-50A-2-11	Hydraulic Conductivity	March 10, 2011

Please contact our office should you have any questions or if we may be of further service.

Sincerely,  
ATLANTIC TESTING LABORATORIES, Limited

Robert E. Field  
Laboratory Manager  
[bfield@atlantictesting.com](mailto:bfield@atlantictesting.com)

REF/nd

Enclosures





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

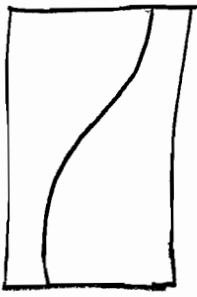
ATL Report No. AT1573SL-73-3-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 23-15

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	3/1/2011
Date of Test	3/10/2011
Age of Sample at Test Date	9 Days
Initial Dry Density (pcf)	83.2
Initial Water Content (%)	36.7
Unconfined Compressive Strength (psi)	76.4
Average Height (in.)	5.512
Average Diameter (in.)	2.992
Height-to-Diameter Ratio	1.84
Average Rate of Strain (%/min)	0.67
Strain at Failure (%)	1.5
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 3/11/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-73-3-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

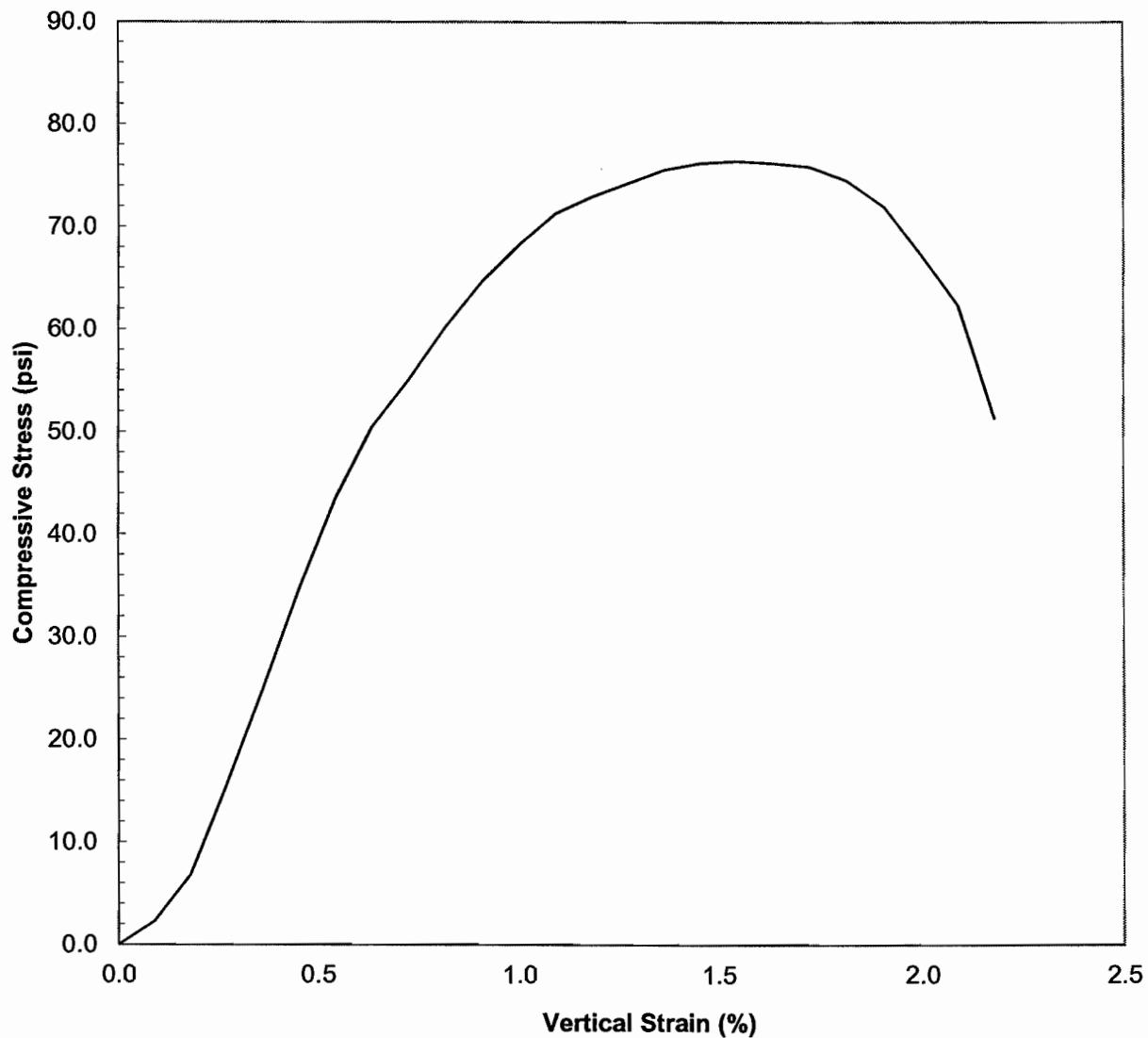
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 23-15, 9 day**

**Depth: N/A**

**ATL Sample No. AT1573S073**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166


ATL Report No. AT1573SL-74-3-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 21-10

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	3/1/2011
Date of Test	3/10/2011
Age of Sample at Test Date	9 Days
Initial Dry Density (pcf)	70.0
Initial Water Content (%)	50.2
Unconfined Compressive Strength (psi)	108.4
Average Height (in.)	5.512
Average Diameter (in.)	2.992
Height-to-Diameter Ratio	1.84
Average Rate of Strain (%/min)	0.67
Strain at Failure (%)	1.4
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 3/11/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-74-3-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

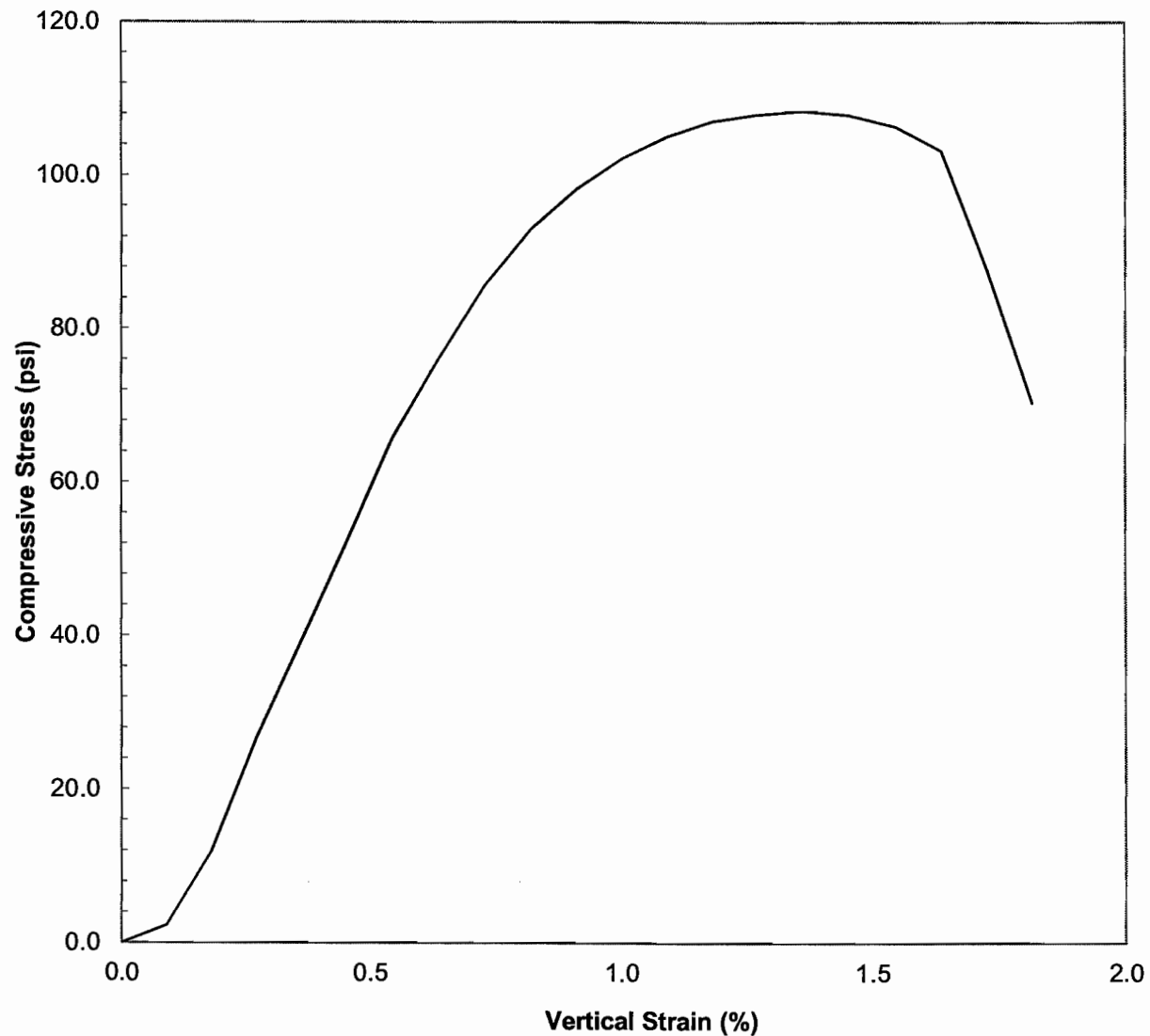
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 21-10, 9 day**

**Depth: N/A**

**ATL Sample No. AT1573S074**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

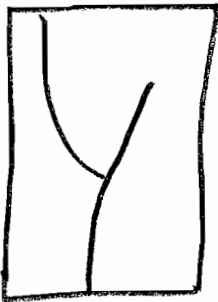
ATL Report No. AT1573SL-75-3-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 20-16

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	3/2/2011
Date of Test	3/10/2011
Age of Sample at Test Date	8 Days
Initial Dry Density (pcf)	73.7
Initial Water Content (%)	45.1
Unconfined Compressive Strength (psi)	86.1
Average Height (in.)	5.472
Average Diameter (in.)	2.997
Height-to-Diameter Ratio	1.83
Average Rate of Strain (%/min)	0.68
Strain at Failure (%)	1.6
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 3/11/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-75-3-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

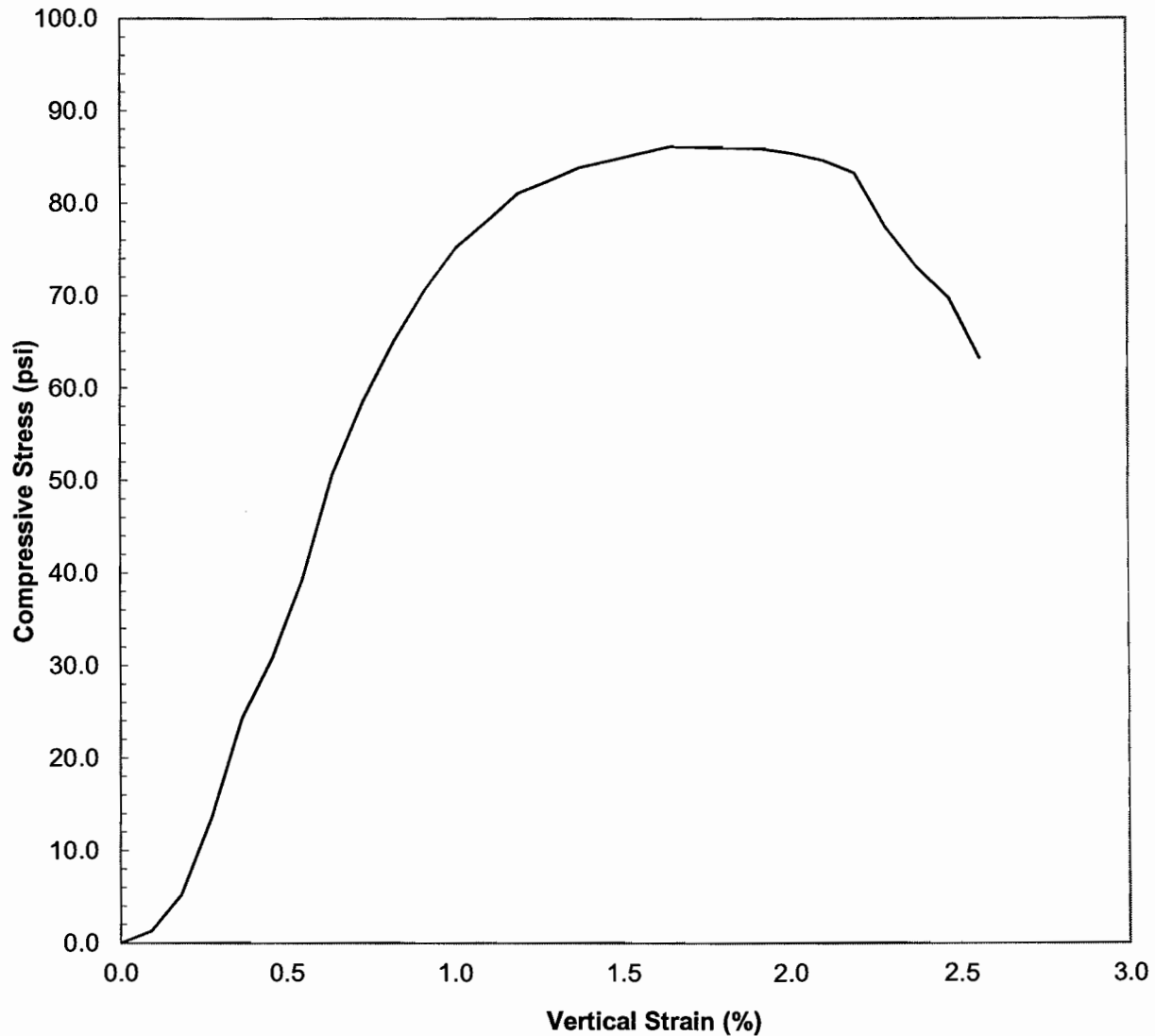
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 20-16, 8 day**

**Depth: N/A**

**ATL Sample No. AT1573S075**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166


ATL Report No. AT1573SL-76-3-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 18-11

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	3/2/2011
Date of Test	3/10/2011
Age of Sample at Test Date	8 Days
Initial Dry Density (pcf)	69.1
Initial Water Content (%)	50.4
Unconfined Compressive Strength (psi)	38.8
Average Height (in.)	5.276
Average Diameter (in.)	3.000
Height-to-Diameter Ratio	1.76
Average Rate of Strain (%/min)	0.70
Strain at Failure (%)	1.5
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 3/11/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-76-3-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

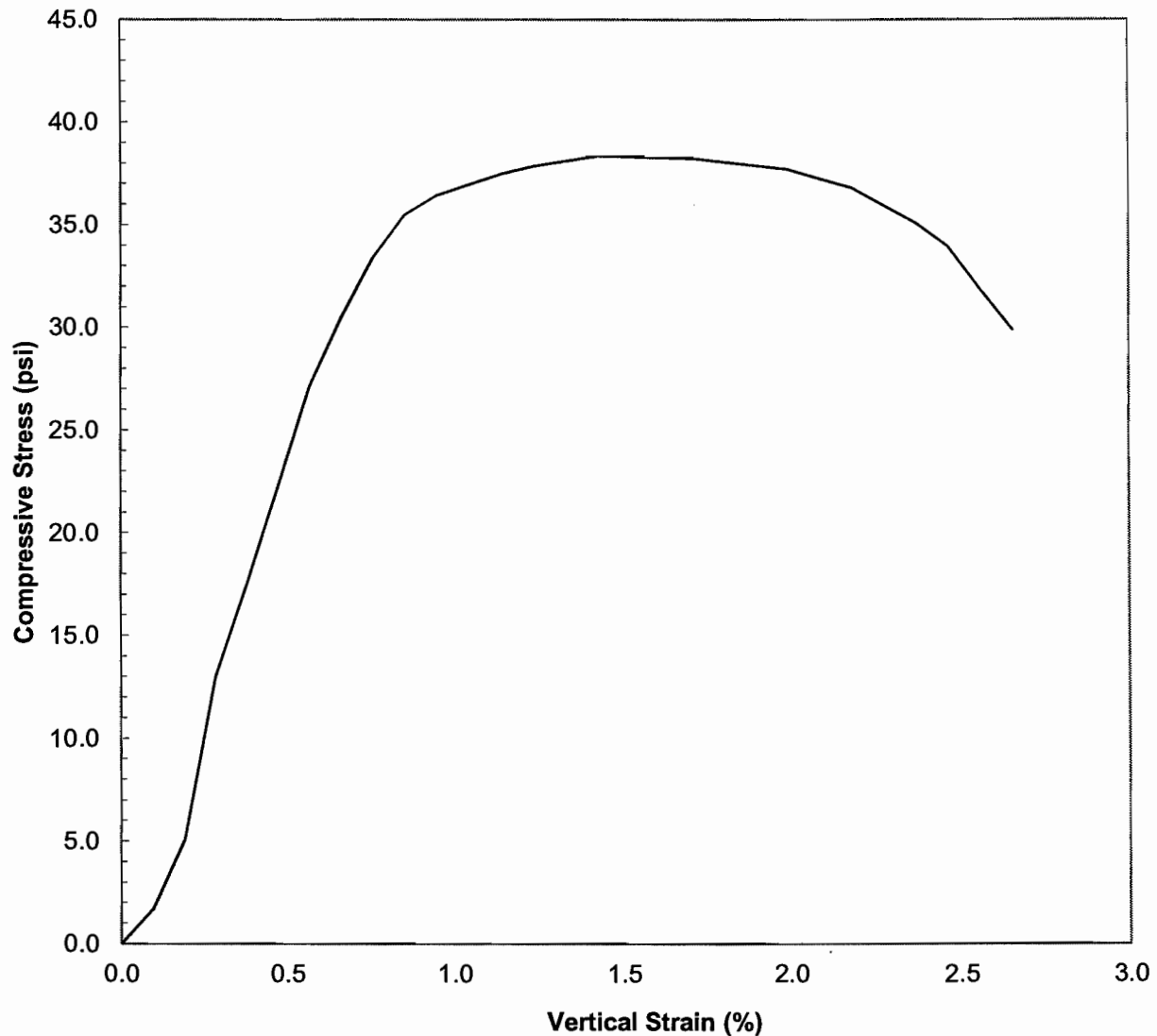
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 18-11, 8 day**

**Depth: N/A**

**ATL Sample No. AT1573S076**







# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166


ATL Report No. AT1573SL-77-3-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 18-16

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	3/3/2011
Date of Test	3/10/2011
Age of Sample at Test Date	7 Days
Initial Dry Density (pcf)	75.8
Initial Water Content (%)	42.4
Unconfined Compressive Strength (psi)	163.6
Average Height (in.)	5.591
Average Diameter (in.)	2.999
Height-to-Diameter Ratio	1.86
Average Rate of Strain (%/min)	0.66
Strain at Failure (%)	1.4
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 3/11/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-77-3-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

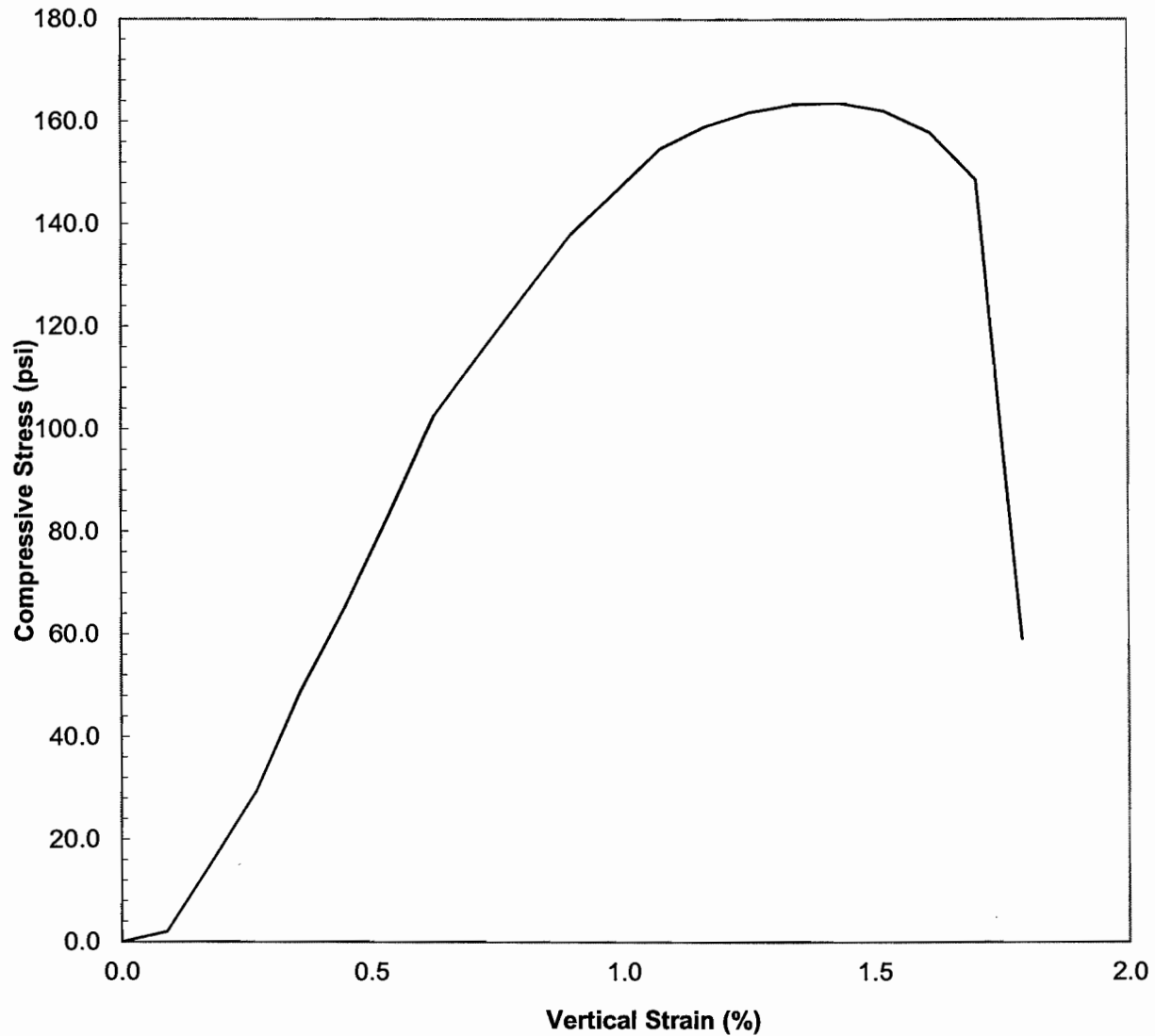
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 18-16, 7 day**

**Depth: N/A**

**ATL Sample No. AT1573S077**





# ATLANTIC TESTING LABORATORIES

**Albany**  
22 Corporate Drive  
Clifton Park, NY 12065  
518-383-9144 (T)  
518-383-9166 (F)

## TRANSMITTAL

March 16, 2011

AECOM  
40 British American Boulevard  
Latham, New York 12110

Attn: Mr. Scott Serviss

E/Mail: [scott.serviss@aecom.com](mailto:scott.serviss@aecom.com)

Re: Soil Laboratory Testing  
NGP Site  
Norwich, New York  
ATL Project No.: AT1573

Dear Mr. Serviss:

Enclosed are the following reports:

AT1573SL-78-3-11	Unconfined Compressive Strength	March 10, 2011
AT1573SL-79-3-11	Unconfined Compressive Strength	March 10, 2011
AT1573SL-80-3-11	Unconfined Compressive Strength	March 10, 2011

Please contact our office should you have any questions or if we may be of further service.

Sincerely,  
ATLANTIC TESTING LABORATORIES, Limited

Robert E. Field  
Laboratory Manager  
[bfield@atlantictesting.com](mailto:bfield@atlantictesting.com)

REF/nd

Enclosures



# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166


ATL Report No. AT1573SL-78-3-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 17-15

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	3/4/2011
Date of Test	3/11/2011
Age of Sample at Test Date	7 Days
Initial Dry Density (pcf)	80.4
Initial Water Content (%)	38.5
Unconfined Compressive Strength (psi)	142.3
Average Height (in.)	5.591
Average Diameter (in.)	3.007
Height-to-Diameter Ratio	1.86
Average Rate of Strain (%/min)	0.66
Strain at Failure (%)	1.3
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 3/15/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-78-3-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

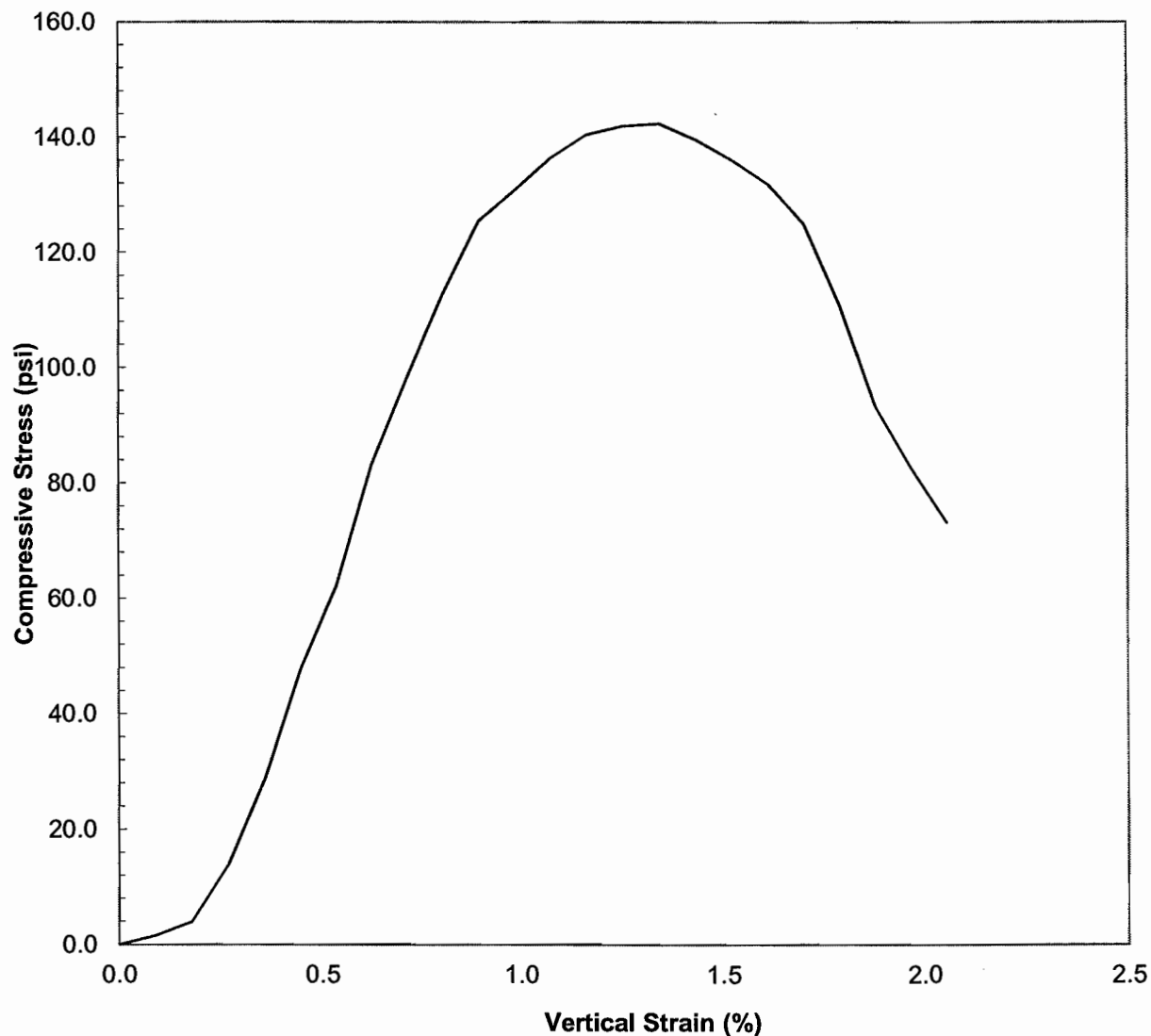
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 17-15, 7 day**

**Depth: N/A**

**ATL Sample No. AT1573S078**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

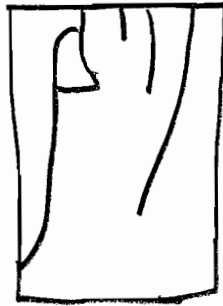
ATL Report No. AT1573SL-79-3-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 14-16

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	3/5/2011
Date of Test	3/15/2011
Age of Sample at Test Date	10 Days
Initial Dry Density (pcf)	80.7
Initial Water Content (%)	37.9
Unconfined Compressive Strength (psi)	149.9
Average Height (in.)	5.669
Average Diameter (in.)	3.005
Height-to-Diameter Ratio	1.89
Average Rate of Strain (%/min)	0.65
Strain at Failure (%)	1.1
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 3/16/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-79-3-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

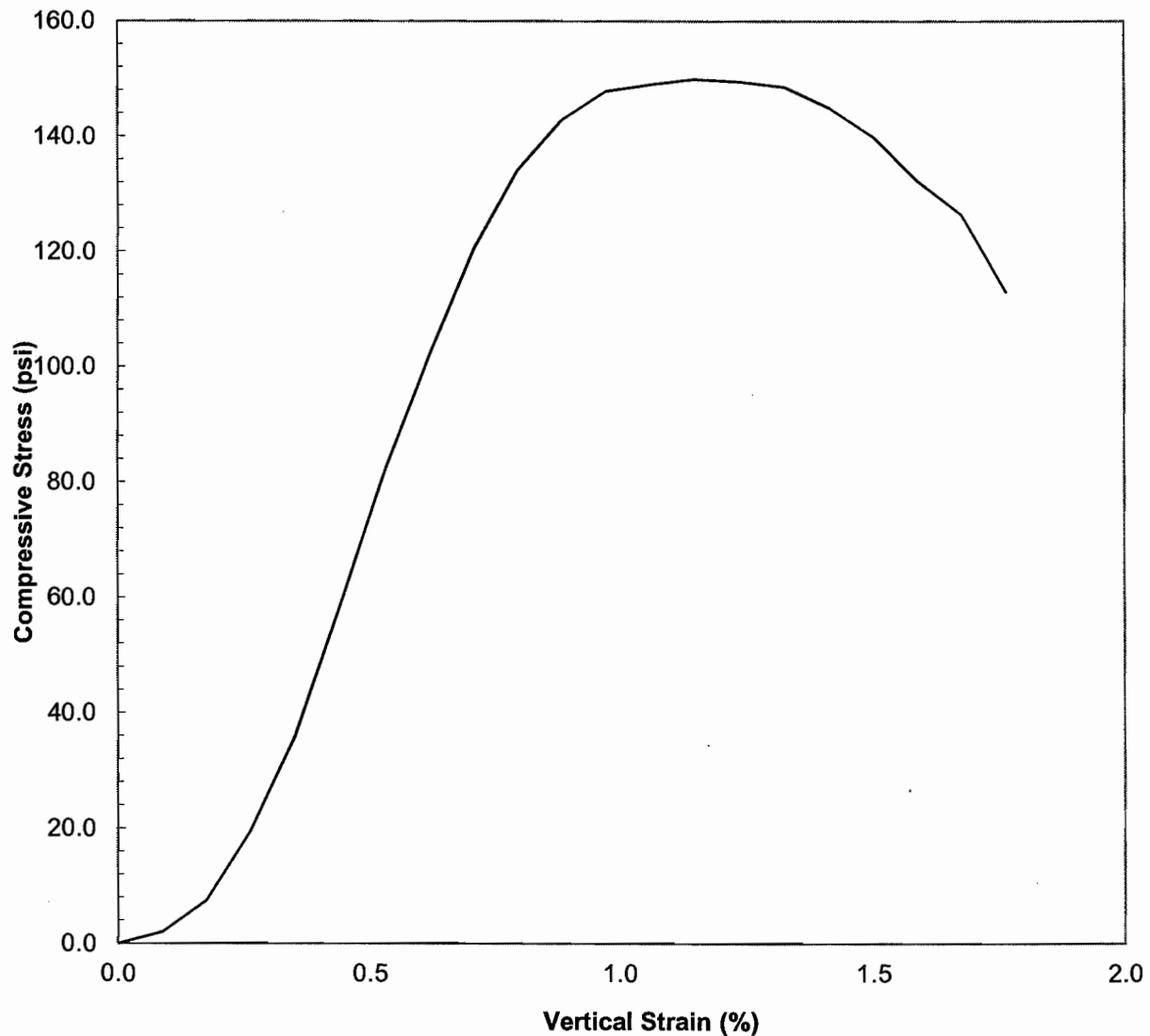
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 14-16, 10 day**

**Depth: N/A**

**ATL Sample No. AT1573S079**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

ATL Report No. AT1573SL-80-3-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 13-15

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	3/5/2011
Date of Test	3/15/2011
Age of Sample at Test Date	10 Days
Initial Dry Density (pcf)	82.8
Initial Water Content (%)	36.2
Unconfined Compressive Strength (psi)	179.7
Average Height (in.)	5.630
Average Diameter (in.)	3.005
Height-to-Diameter Ratio	1.87
Average Rate of Strain (%/min)	0.66
Strain at Failure (%)	1.1
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by:

Date: 3/16/11





# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-80-3-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

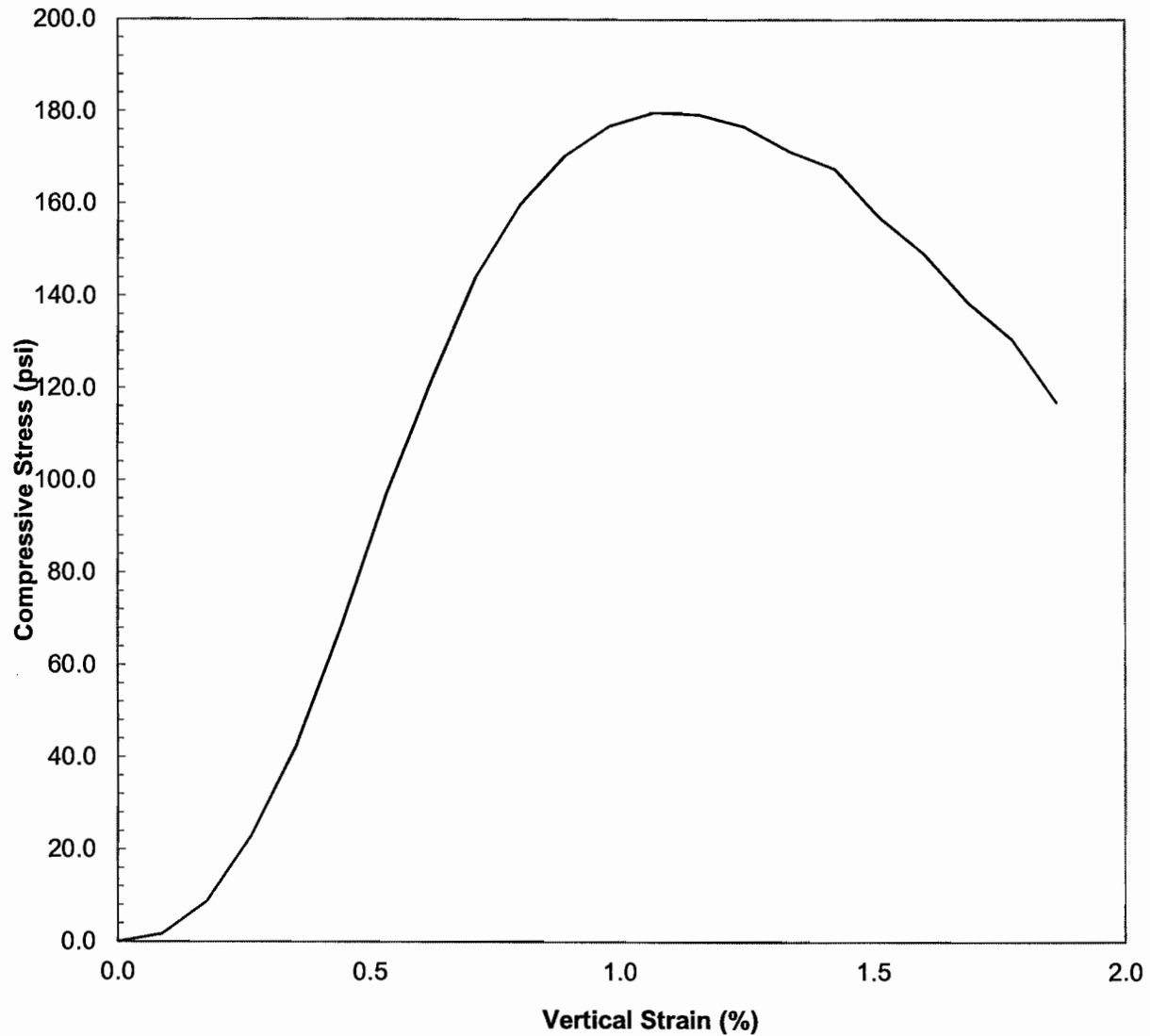
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 13-15, 10 day**

**Depth: N/A**

**ATL Sample No. AT1573S080**





# ATLANTIC TESTING LABORATORIES

**Albany**  
22 Corporate Drive  
Clifton Park, NY 12065  
518-383-9144 (T)  
518-383-9166 (F)

## TRANSMITTAL

March 18, 2011

AECOM  
40 British American Boulevard  
Latham, New York 12110

Attn: Mr. Scott Serviss

E/Mail: [scott.serviss@aecom.com](mailto:scott.serviss@aecom.com)

Re: Soil Laboratory Testing  
NGP Site  
Norwich, New York  
ATL Project No.: AT1573

Dear Mr. Serviss:

Enclosed are the following reports:

AT1573SL-81-3-11	Unconfined Compressive Strength	March 16, 2011
AT1573SL-82-3-11	Unconfined Compressive Strength	March 16, 2011
AT1573SL-83-3-11	Unconfined Compressive Strength	March 16, 2011

Please contact our office should you have any questions or if we may be of further service.

Sincerely,  
ATLANTIC TESTING LABORATORIES, Limited

Robert E. Field  
Laboratory Manager  
[bfield@atlantictesting.com](mailto:bfield@atlantictesting.com)

REF/nd

Enclosures



# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166


ATL Report No. AT1573SL-81-3-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 11-15

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	3/8/2011
Date of Test	3/17/2011
Age of Sample at Test Date	9 Days
Initial Dry Density (pcf)	76.0
Initial Water Content (%)	42.9
Unconfined Compressive Strength (psi)	155.1
Average Height (in.)	5.472
Average Diameter (in.)	3.007
Height-to-Diameter Ratio	1.82
Average Rate of Strain (%/min)	0.68
Strain at Failure (%)	1.1
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 3/18/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-81-3-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

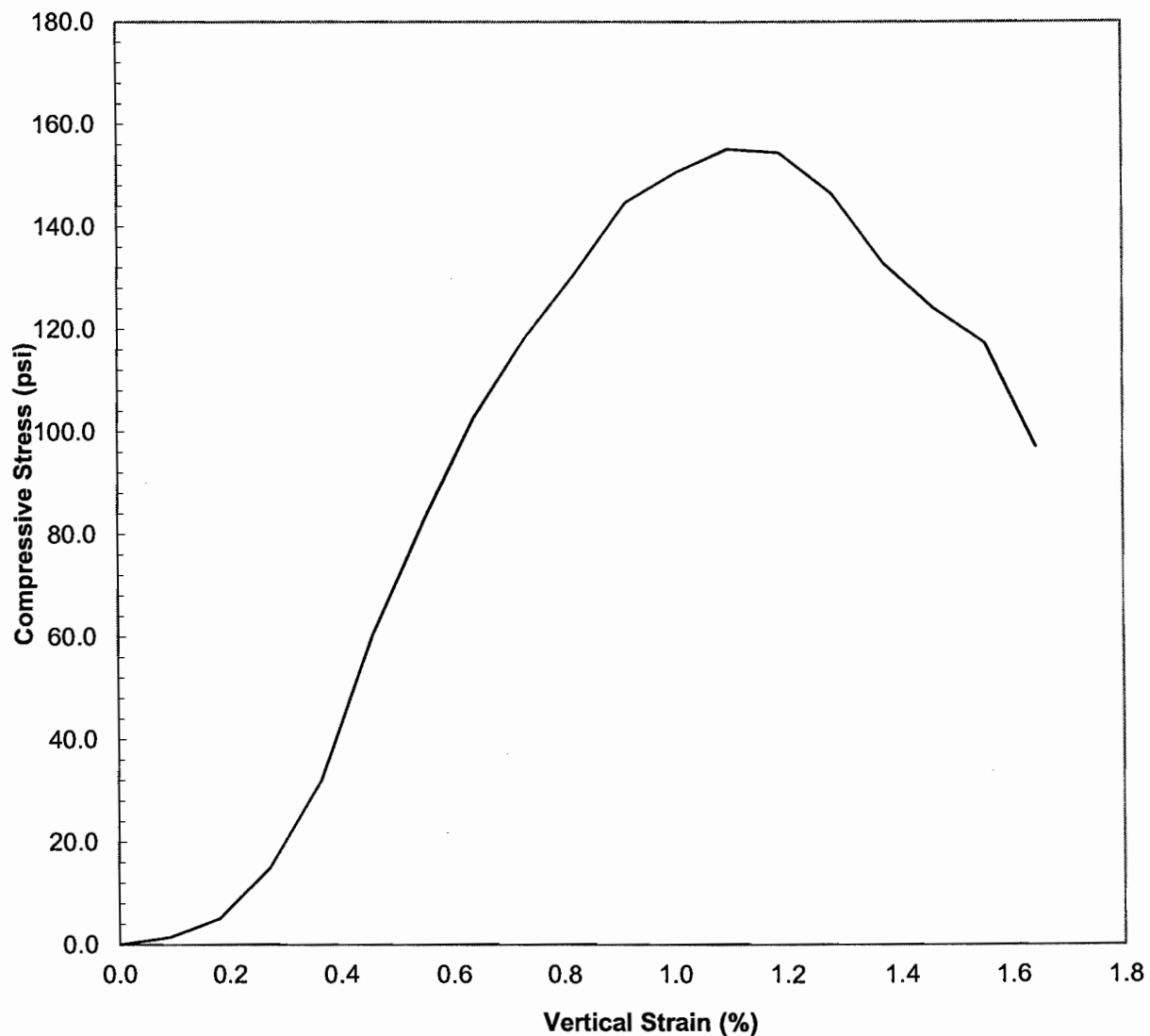
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 11-15, 9 day**

**Depth: N/A**

**ATL Sample No. AT1573S081**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

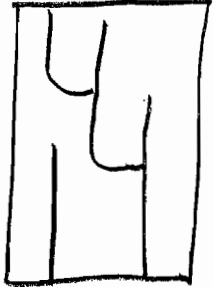
ATL Report No. AT1573SL-82-3-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 10-12

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	3/9/2011
Date of Test	3/17/2011
Age of Sample at Test Date	8 Days
Initial Dry Density (pcf)	80.4
Initial Water Content (%)	37.5
Unconfined Compressive Strength (psi)	197.6
Average Height (in.)	5.472
Average Diameter (in.)	3.003
Height-to-Diameter Ratio	1.82
Average Rate of Strain (%/min)	0.68
Strain at Failure (%)	1.5
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 3/18/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-82-3-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

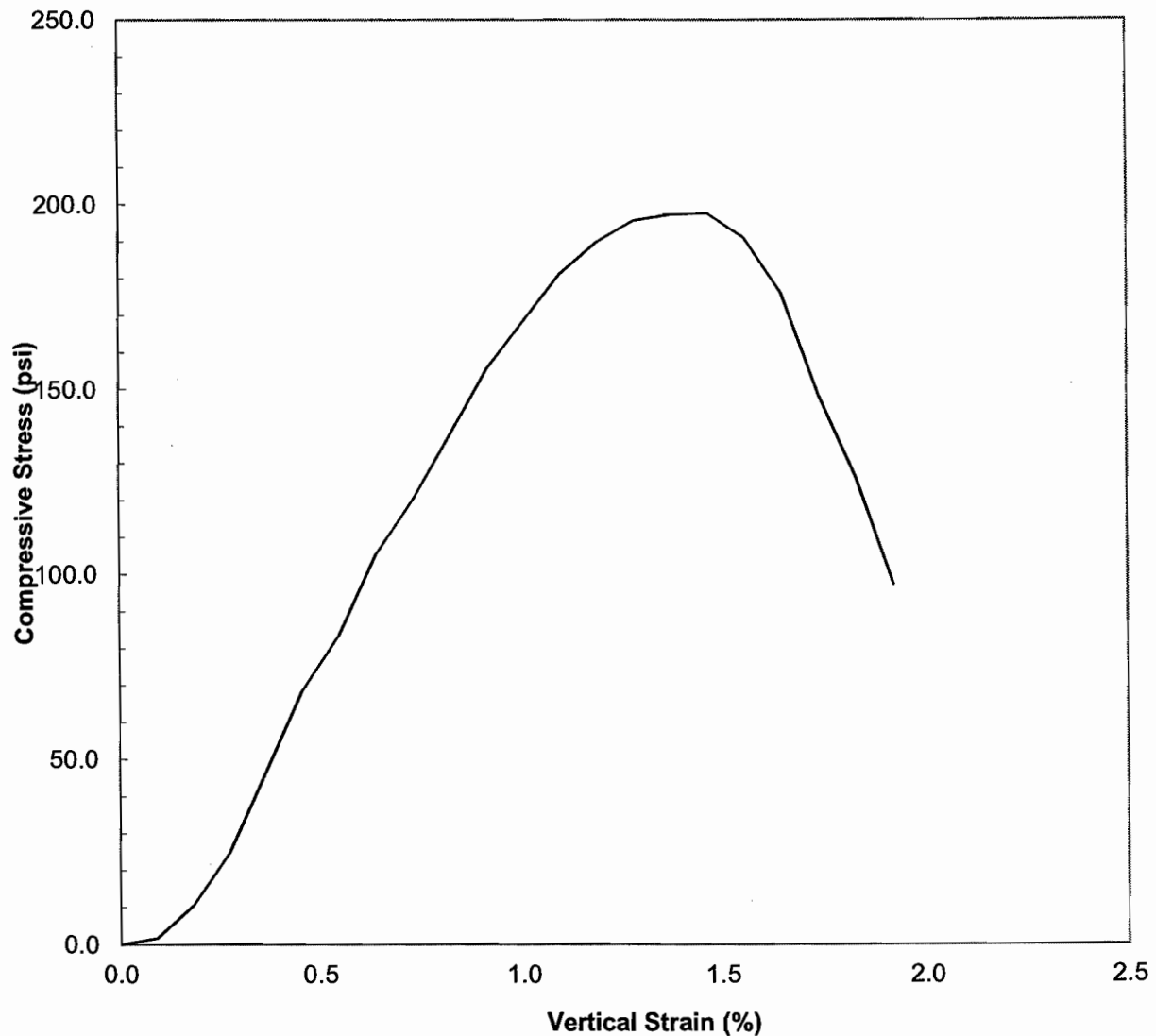
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 10-12, 8 day**

**Depth: N/A**

**ATL Sample No. AT1573S082**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

ATL Report No. AT1573SL-83-3-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 10-13

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	3/10/2011
Date of Test	3/17/2011
Age of Sample at Test Date	7 Days
Initial Dry Density (pcf)	83.8
Initial Water Content (%)	34.4
Unconfined Compressive Strength (psi)	204.9
Average Height (in.)	5.512
Average Diameter (in.)	3.008
Height-to-Diameter Ratio	1.83
Average Rate of Strain (%/min)	0.67
Strain at Failure (%)	1.4
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by:

Date: 3/18/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-83-3-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

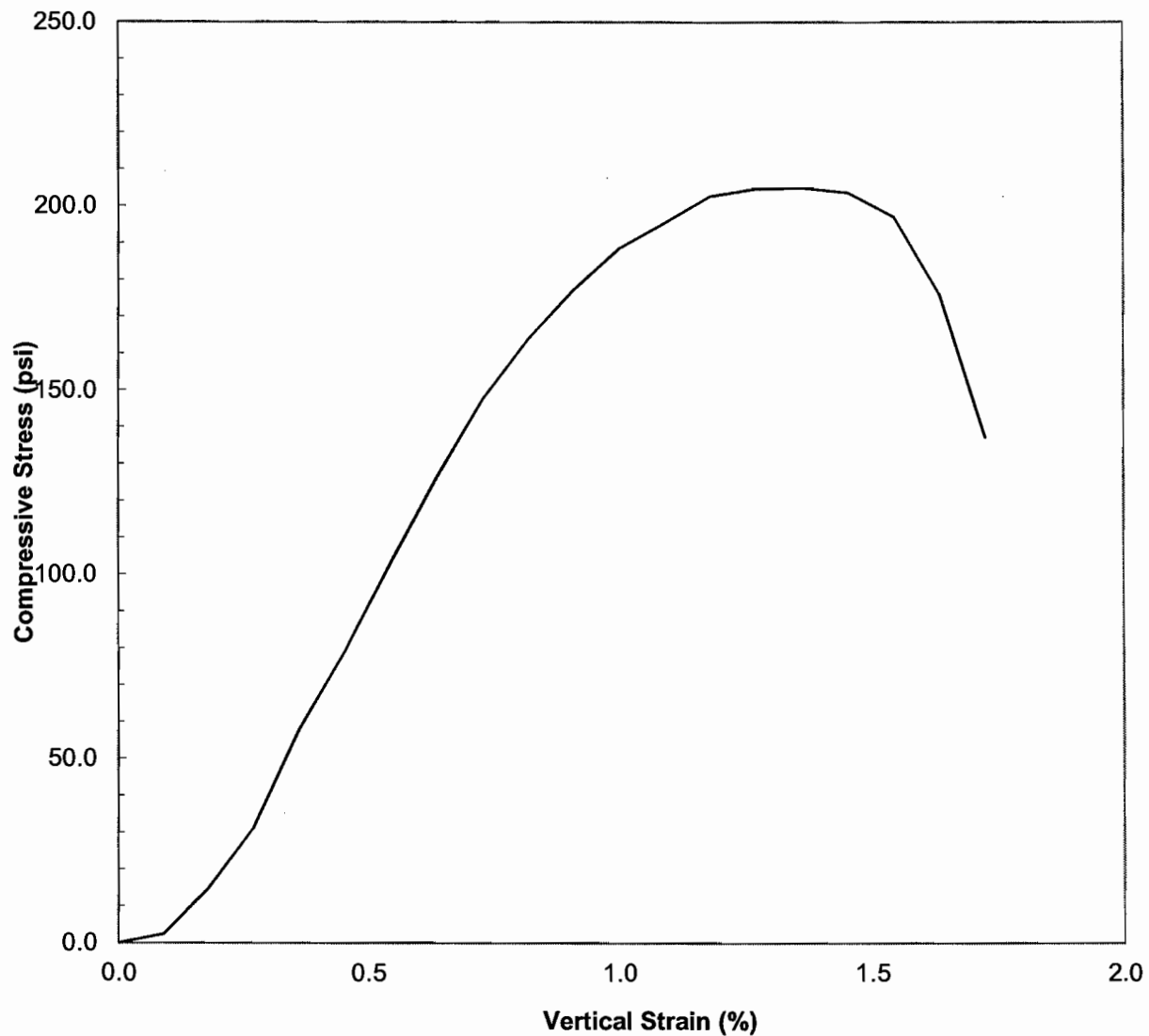
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 10-13, 7 day**

**Depth: N/A**

**ATL Sample No. AT1573S083**







# ATLANTIC TESTING LABORATORIES

**Albany**  
22 Corporate Drive  
Clifton Park, NY 12065  
518-383-9144 (T)  
518-383-9166 (F)

## TRANSMITTAL

March 22, 2011

AECOM  
40 British American Boulevard  
Latham, New York 12110

Attn: Mr. Scott Serviss

E/Mail: [scott.serviss@aecom.com](mailto:scott.serviss@aecom.com)

Re: Soil Laboratory Testing  
NGP Site  
Norwich, New York  
ATL Project No.: AT1573

Dear Mr. Serviss:

Enclosed are the following reports:

AT1573SL-84-3-11	Unconfined Compressive Strength	March 16, 2011
AT1573SL-85-3-11	Unconfined Compressive Strength	March 16, 2011
AT1573SL-86-3-11	Unconfined Compressive Strength	March 16, 2011
AT1573SL-87-3-11	Unconfined Compressive Strength	March 16, 2011

Please contact our office should you have any questions or if we may be of further service.

Sincerely,  
ATLANTIC TESTING LABORATORIES, Limited

Robert E. Field  
Laboratory Manager  
[bfield@atlantictesting.com](mailto:bfield@atlantictesting.com)

REF/nd

Enclosures



# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

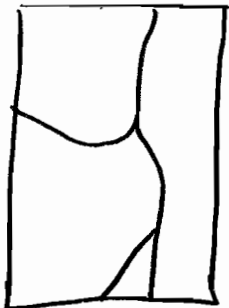
ATL Report No. AT1573SL-84-3-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 10-15

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	3/11/2011
Date of Test	3/21/2011
Age of Sample at Test Date	10 Days
Initial Dry Density (pcf)	83.6
Initial Water Content (%)	35.7
Unconfined Compressive Strength (psi)	271.8
Average Height (in.)	5.630
Average Diameter (in.)	3.007
Height-to-Diameter Ratio	1.87
Average Rate of Strain (%/min)	0.66
Strain at Failure (%)	1.2
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 3/22/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-84-3-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

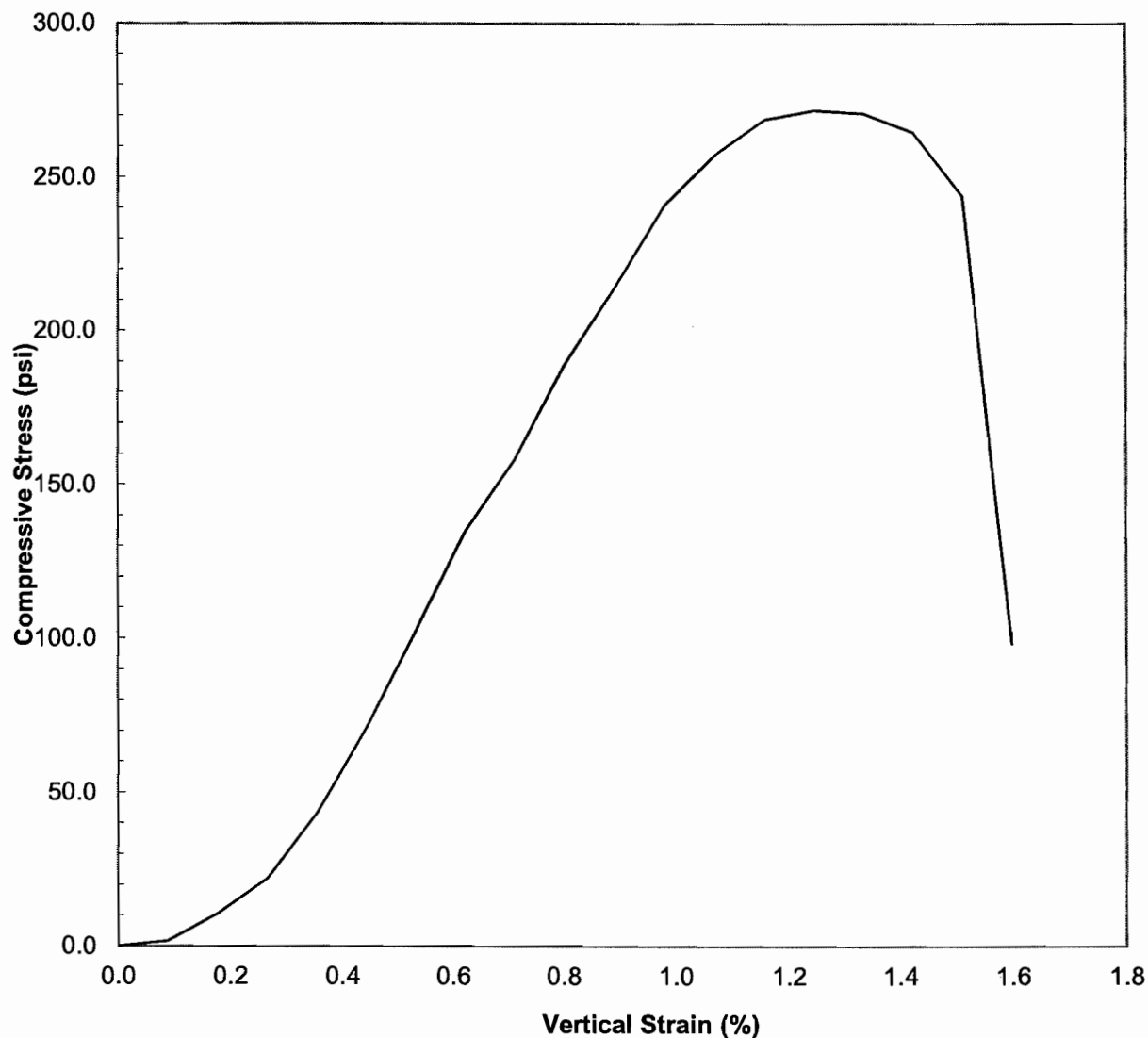
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 10-15, 10 day**

**Depth: N/A**

**ATL Sample No. AT1573S084**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

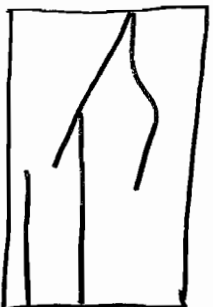
ATL Report No. AT1573SL-85-3-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 30-21

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	3/13/2011
Date of Test	3/21/2011
Age of Sample at Test Date	8 Days
Initial Dry Density (pcf)	80.5
Initial Water Content (%)	39.1
Unconfined Compressive Strength (psi)	276.3
Average Height (in.)	5.630
Average Diameter (in.)	3.004
Height-to-Diameter Ratio	1.87
Average Rate of Strain (%/min)	0.66
Strain at Failure (%)	1.4
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 3/22/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-85-3-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

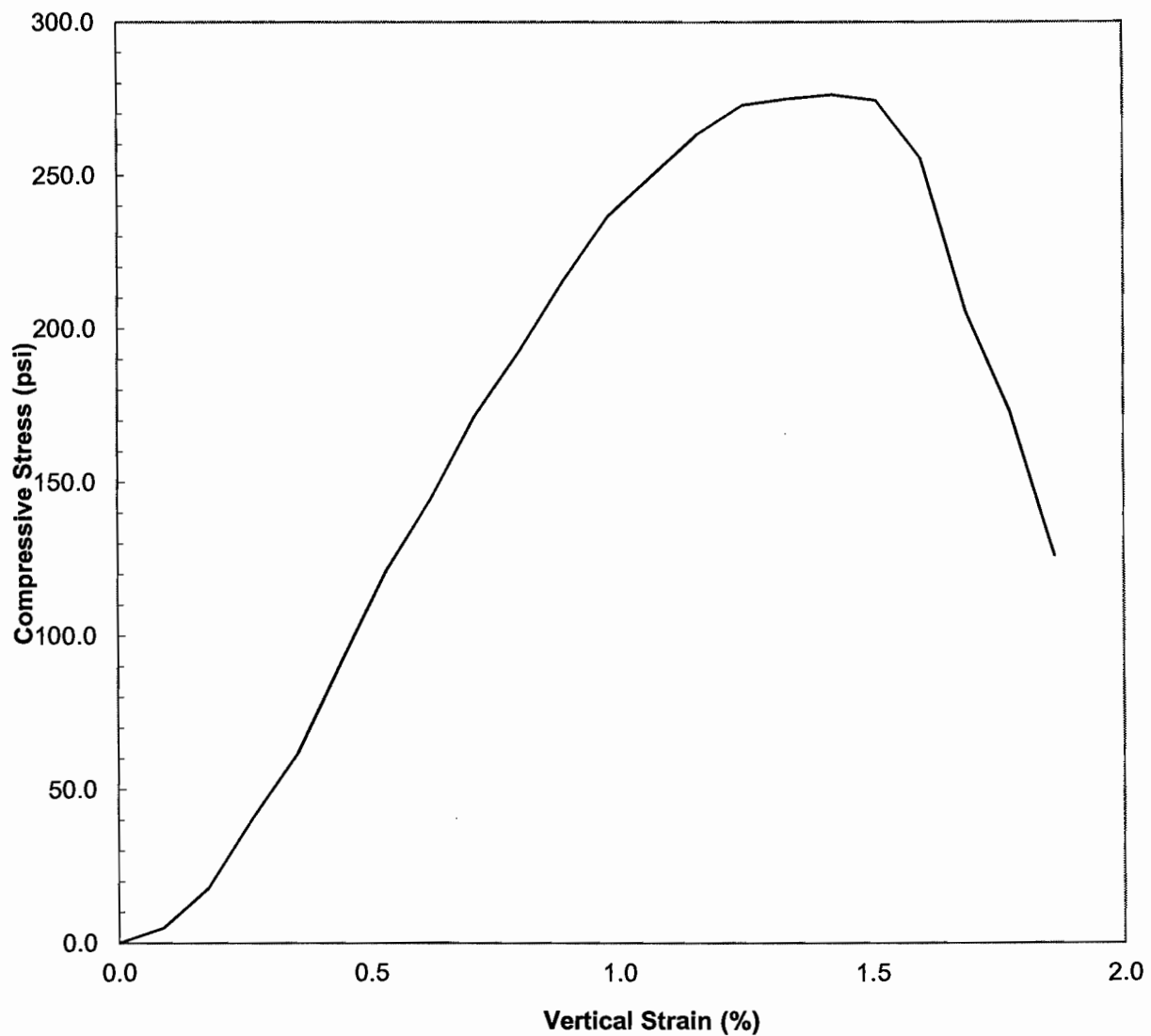
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 30-21, 8 day**

**Depth: N/A**

**ATL Sample No. AT1573S085**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

ATL Report No. AT1573SL-86-3-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 31-15

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	3/13/2011
Date of Test	3/21/2011
Age of Sample at Test Date	8 Days
Initial Dry Density (pcf)	80.9
Initial Water Content (%)	39.2
Unconfined Compressive Strength (psi)	247.2
Average Height (in.)	5.512
Average Diameter (in.)	3.004
Height-to-Diameter Ratio	1.83
Average Rate of Strain (%/min)	0.67
Strain at Failure (%)	1.4
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by:

Date: 3/22/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-86-3-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

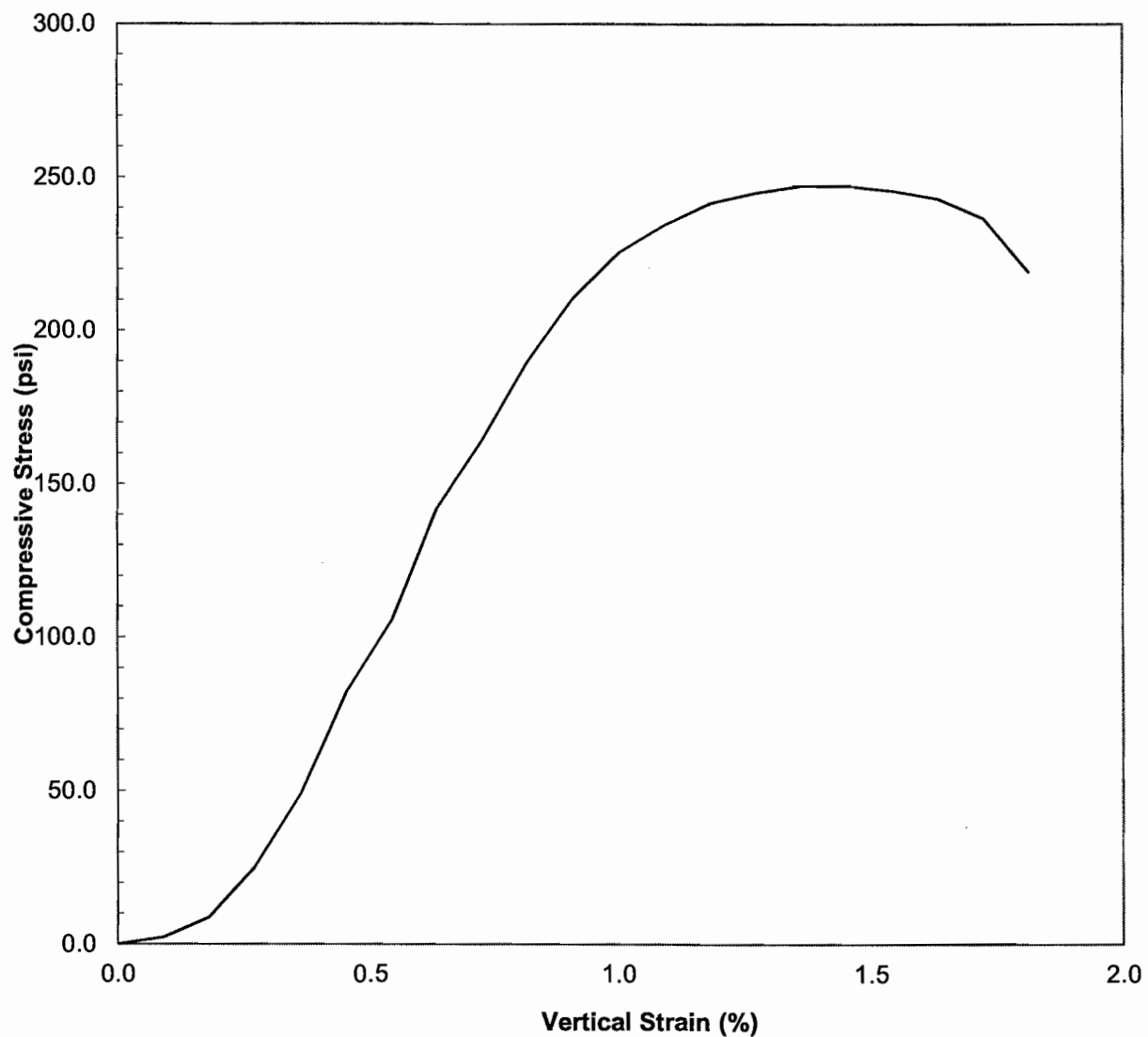
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 31-15, 8 day**

**Depth: N/A**

**ATL Sample No. AT1573S086**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166


ATL Report No. AT1573SL-87-3-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 29-20

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	3/14/2011
Date of Test	3/21/2011
Age of Sample at Test Date	7 Days
Initial Dry Density (pcf)	77.0
Initial Water Content (%)	42.2
Unconfined Compressive Strength (psi)	336.0
Average Height (in.)	5.512
Average Diameter (in.)	3.003
Height-to-Diameter Ratio	1.84
Average Rate of Strain (%/min)	0.67
Strain at Failure (%)	1.5
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 3/22/11





# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-87-3-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

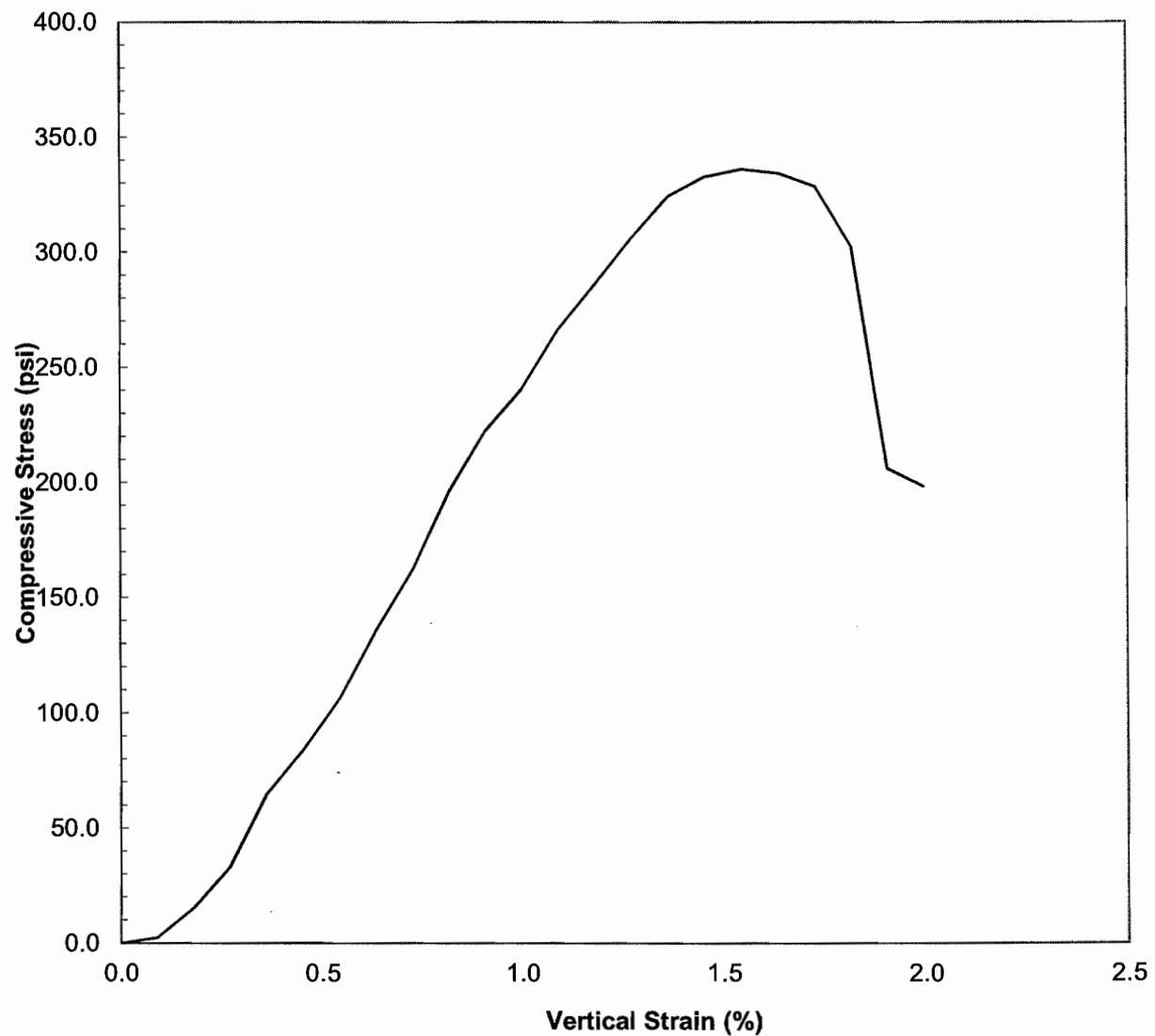
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 29-20, 7 day**

**Depth: N/A**

**ATL Sample No. AT1573S087**





# ATLANTIC TESTING LABORATORIES

**Albany**  
22 Corporate Drive  
Clifton Park, NY 12065  
518-383-9144 (T)  
518-383-9166 (F)

## TRANSMITTAL

March 29, 2011

AECOM  
40 British American Boulevard  
Latham, New York 12110

Attn: Mr. Scott Serviss

E/Mail: [scott.serviss@aecom.com](mailto:scott.serviss@aecom.com)

Re: Soil Laboratory Testing  
NGP Site  
Norwich, New York  
ATL Project No.: AT1573

Dear Mr. Serviss:

Enclosed are the following reports:

AT1573SL-88-3-11	Unconfined Compressive Strength	March 24, 2011
AT1573SL-89-3-11	Unconfined Compressive Strength	March 24, 2011
AT1573SL-90-3-11	Unconfined Compressive Strength	March 24, 2011
AT1573SL-91-3-11	Unconfined Compressive Strength	March 24, 2011
AT1573SL-92-3-11	Unconfined Compressive Strength	March 24, 2011
AT1573SL-93-3-11	Unconfined Compressive Strength	March 24, 2011
AT1573SL-94-3-11	Unconfined Compressive Strength	March 24, 2011

Please contact our office should you have any questions or if we may be of further service.

Sincerely,  
*ATLANTIC TESTING LABORATORIES, Limited*

Robert E. Field  
Laboratory Manager  
[bfield@atlantictesting.com](mailto:bfield@atlantictesting.com)

REF/nd

Enclosures



# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

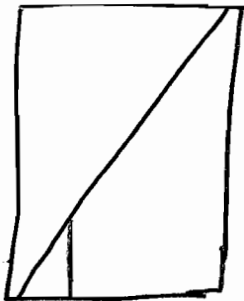
ATL Report No. AT1573SL-88-3-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 28-21

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	3/15/2011
Date of Test	3/28/2011
Age of Sample at Test Date	13 Days
Initial Dry Density (pcf)	77.5
Initial Water Content (%)	41.7
Unconfined Compressive Strength (psi)	221.5
Average Height (in.)	5.669
Average Diameter (in.)	3.007
Height-to-Diameter Ratio	1.89
Average Rate of Strain (%/min)	0.65
Strain at Failure (%)	1.3
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 3/29/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-88-3-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

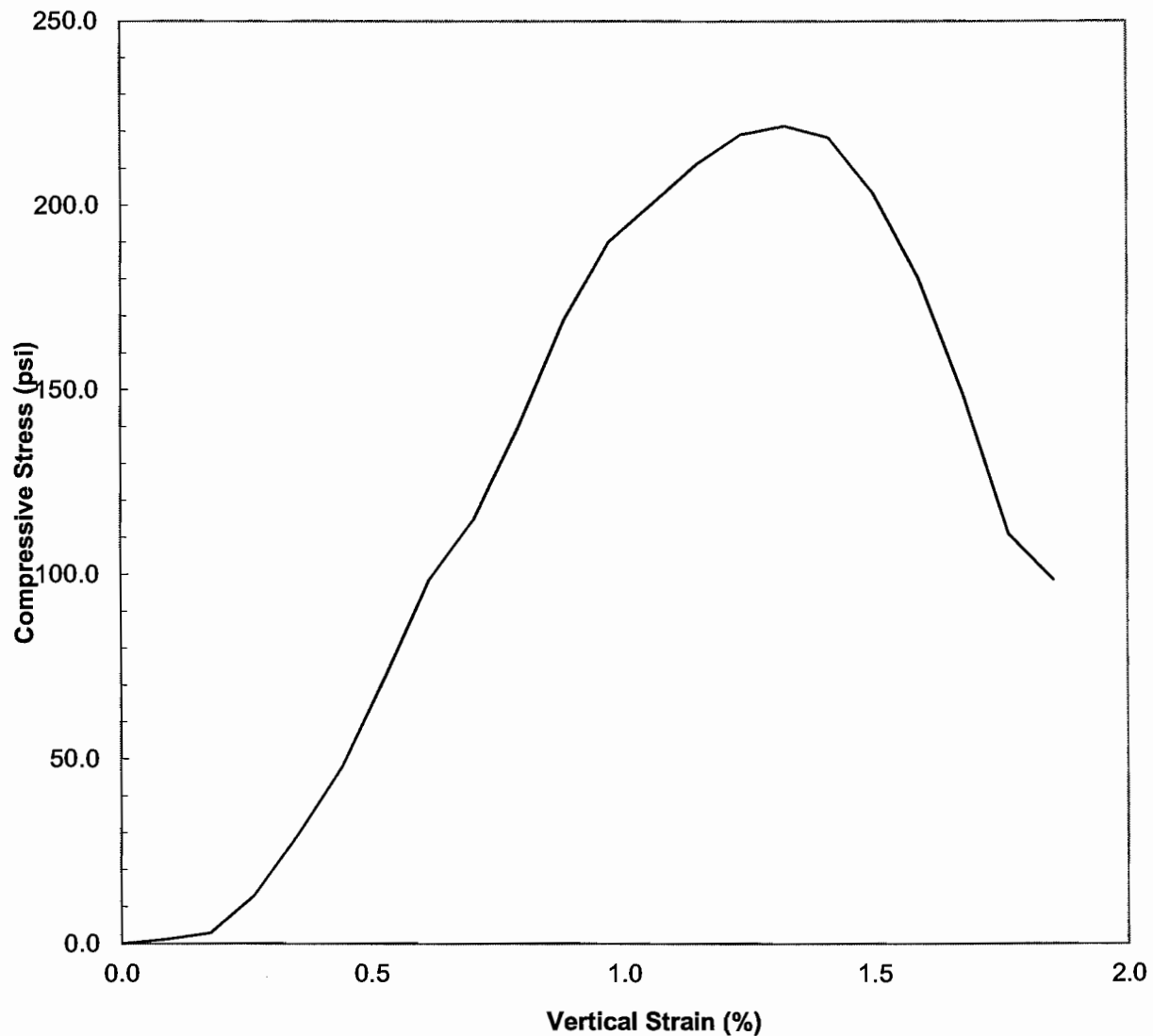
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 28-21, 13 day**

**Depth: N/A**

**ATL Sample No. AT1573S88**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166


ATL Report No. AT1573SL-89-3-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 26-20

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	3/16/2011
Date of Test	3/28/2011
Age of Sample at Test Date	12 Days
Initial Dry Density (pcf)	80.4
Initial Water Content (%)	39.2
Unconfined Compressive Strength (psi)	328.8
Average Height (in.)	5.512
Average Diameter (in.)	3.001
Height-to-Diameter Ratio	1.84
Average Rate of Strain (%/min)	0.67
Strain at Failure (%)	1.6
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 3/29/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-89-3-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

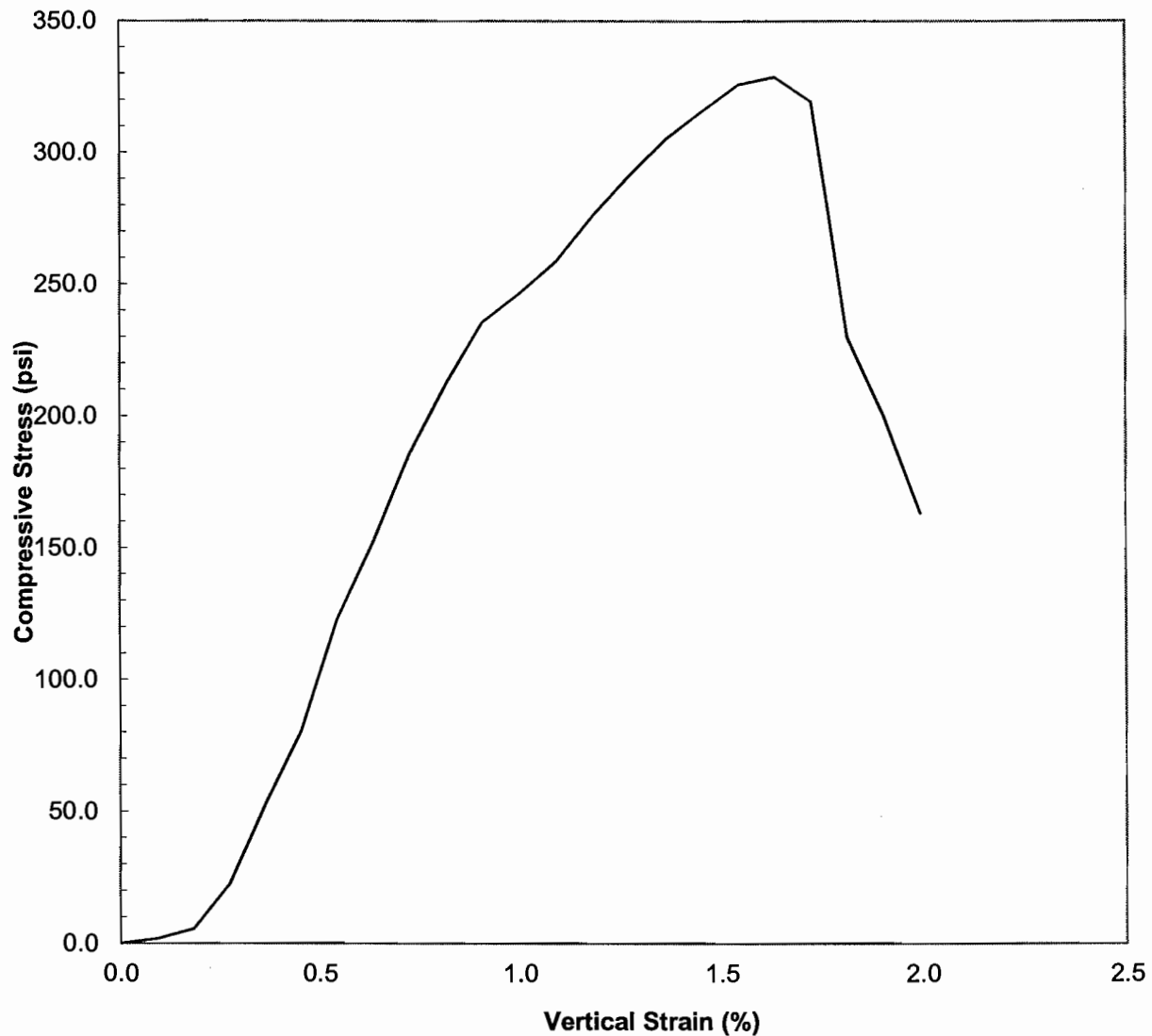
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 26-20, 12 day**

**Depth: N/A**

**ATL Sample No. AT1573S89**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

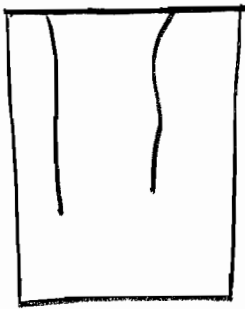
ATL Report No. AT1573SL-90-3-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 24-20

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	3/17/2011
Date of Test	3/28/2011
Age of Sample at Test Date	11 Days
Initial Dry Density (pcf)	78.2
Initial Water Content (%)	40.8
Unconfined Compressive Strength (psi)	182.3
Average Height (in.)	5.394
Average Diameter (in.)	3.003
Height-to-Diameter Ratio	1.80
Average Rate of Strain (%/min)	0.69
Strain at Failure (%)	1.3
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 3/29/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-90-3-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

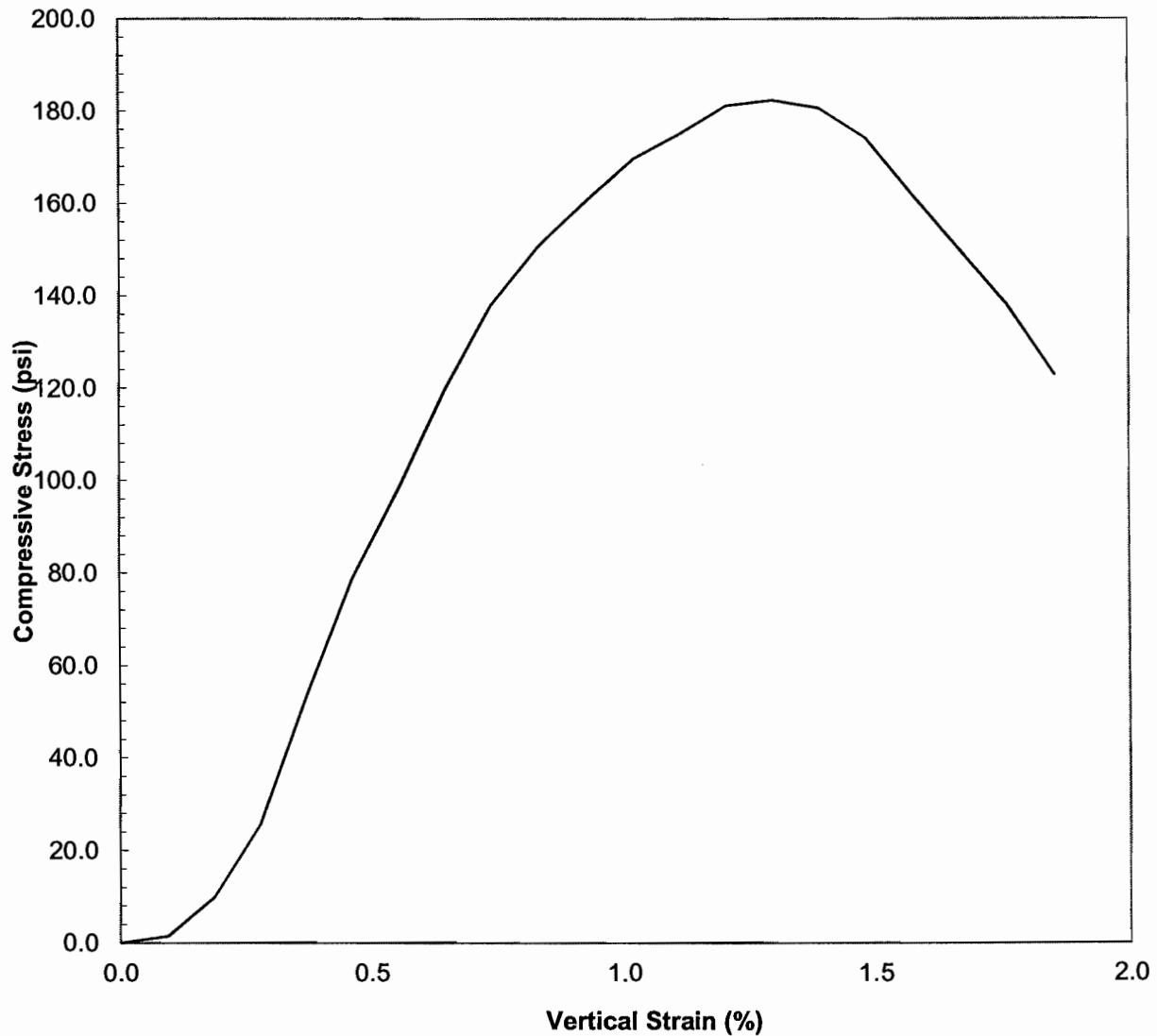
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 24-20, 11 day**

**Depth: N/A**

**ATL Sample No. AT1573S90**







# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166


ATL Report No. AT1573SL-91-3-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 23-20

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	3/17/2011
Date of Test	3/28/2011
Age of Sample at Test Date	11 Days
Initial Dry Density (pcf)	77.5
Initial Water Content (%)	41.5
Unconfined Compressive Strength (psi)	260.2
Average Height (in.)	5.669
Average Diameter (in.)	3.009
Height-to-Diameter Ratio	1.88
Average Rate of Strain (%/min)	0.65
Strain at Failure (%)	1.2
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 3/29/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-91-3-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

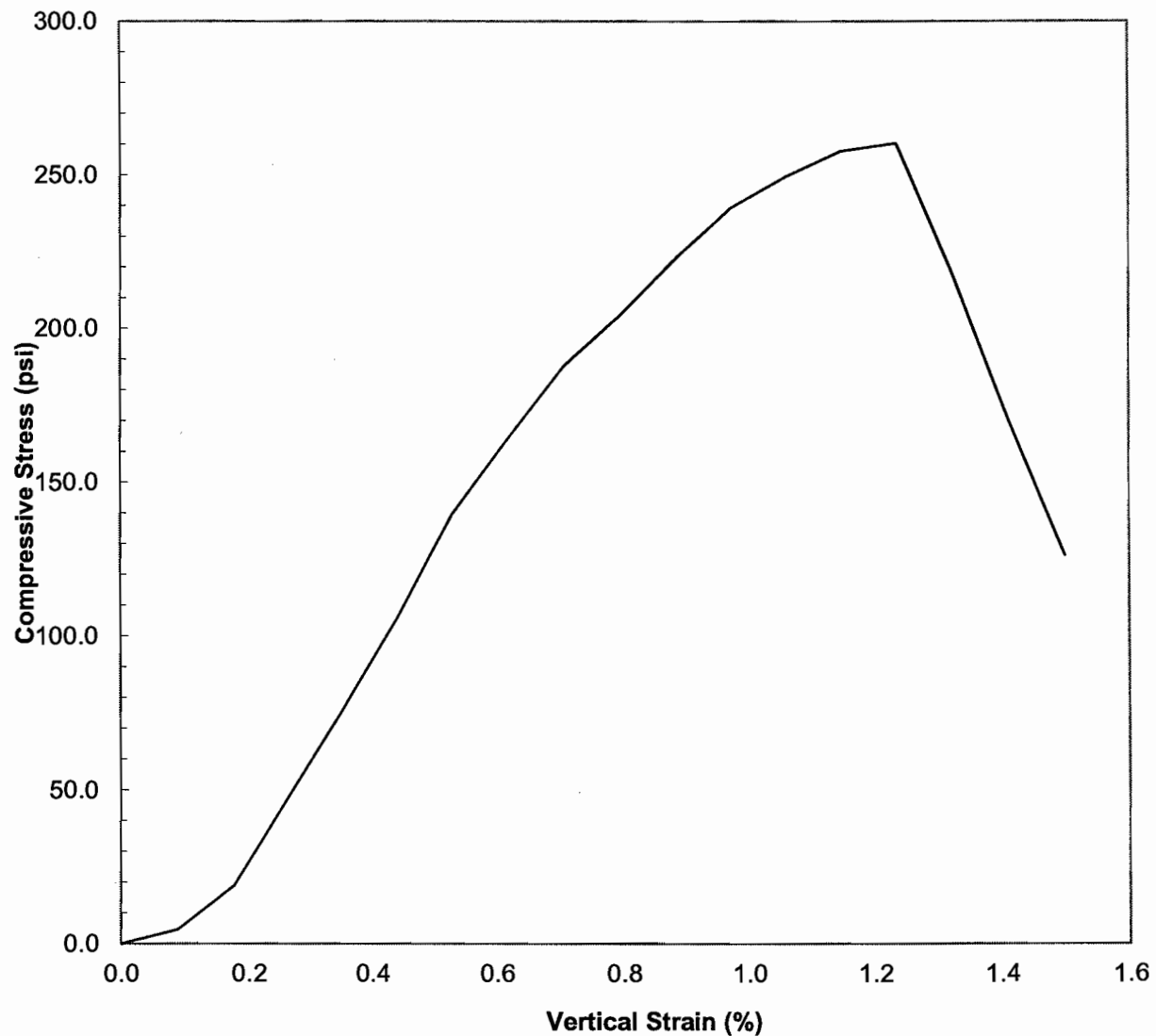
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 23-20, 11 day**

**Depth: N/A**

**ATL Sample No. AT1573S91**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

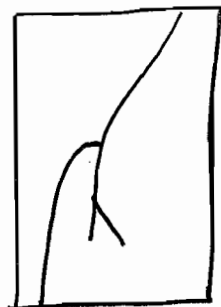
ATL Report No. AT1573SL-92-3-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 23-23

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	3/18/2011
Date of Test	3/28/2011
Age of Sample at Test Date	10 Days
Initial Dry Density (pcf)	77.7
Initial Water Content (%)	41.9
Unconfined Compressive Strength (psi)	182.4
Average Height (in.)	5.433
Average Diameter (in.)	3.004
Height-to-Diameter Ratio	1.81
Average Rate of Strain (%/min)	0.68
Strain at Failure (%)	1.2
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 3/29/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-92-3-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

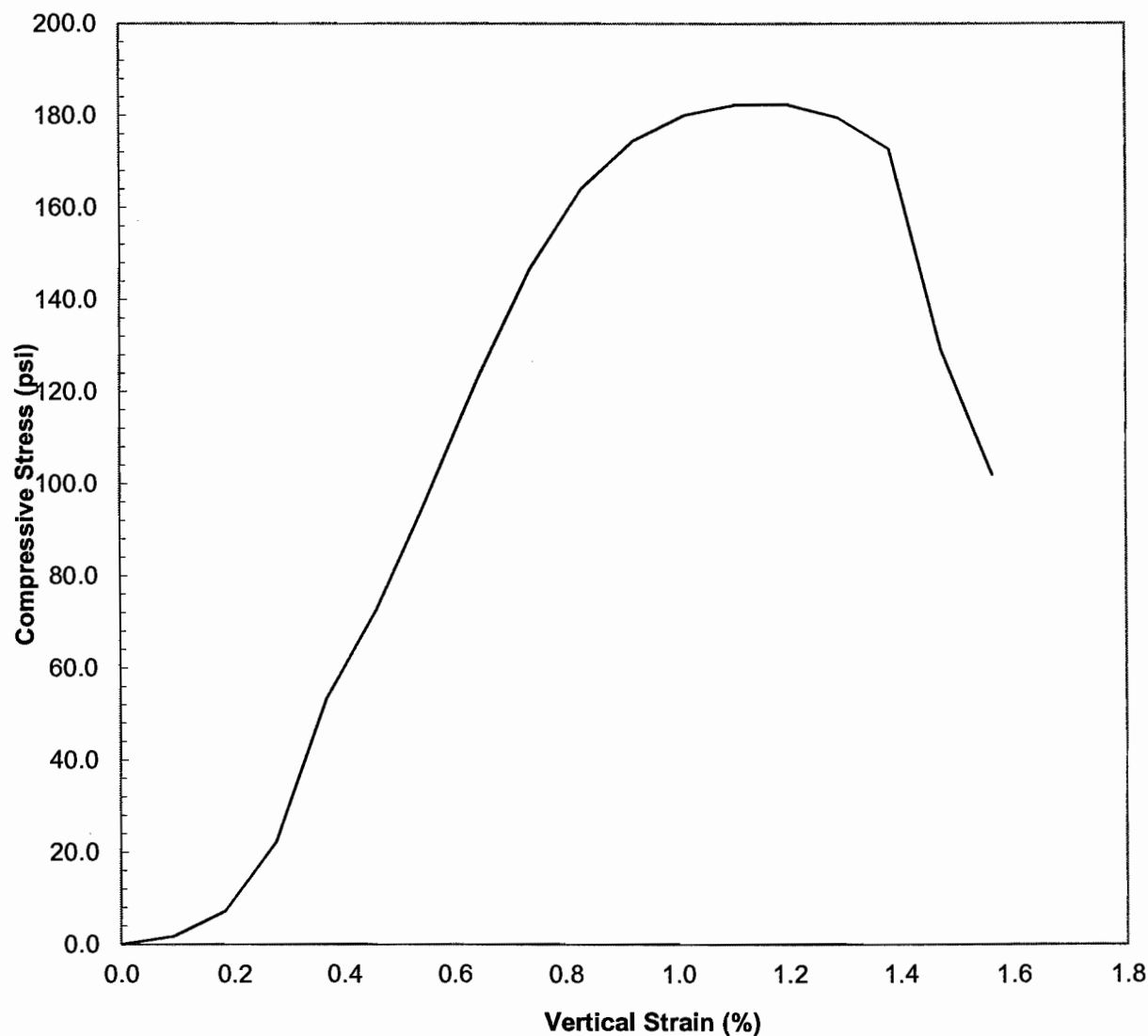
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 23-23, 10 day**

**Depth: N/A**

**ATL Sample No. AT1573S92**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166


ATL Report No. AT1573SL-93-3-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 19-25

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	3/19/2011
Date of Test	3/28/2011
Age of Sample at Test Date	9 Days
Initial Dry Density (pcf)	77.1
Initial Water Content (%)	41.4
Unconfined Compressive Strength (psi)	337.0
Average Height (in.)	5.669
Average Diameter (in.)	3.004
Height-to-Diameter Ratio	1.89
Average Rate of Strain (%/min)	0.65
Strain at Failure (%)	1.2
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 3/29/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-93-3-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

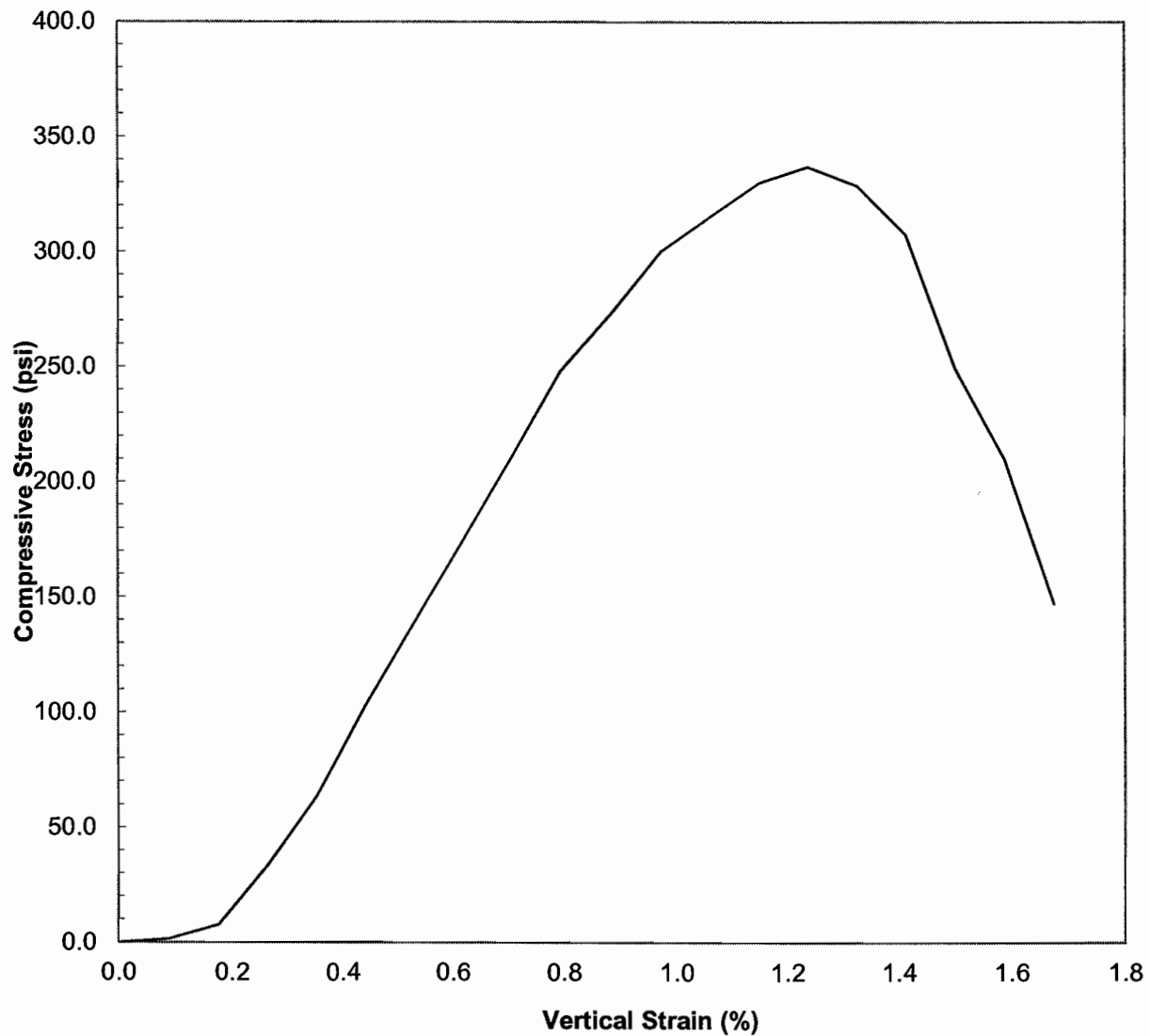
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 19-25, 9 day**

**Depth: N/A**

**ATL Sample No. AT1573S93**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166


ATL Report No. AT1573SL-94-3-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 30-15

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	3/21/2011
Date of Test	3/28/2011
Age of Sample at Test Date	7 Days
Initial Dry Density (pcf)	73.1
Initial Water Content (%)	44.4
Unconfined Compressive Strength (psi)	351.0
Average Height (in.)	5.591
Average Diameter (in.)	3.007
Height-to-Diameter Ratio	1.86
Average Rate of Strain (%/min)	0.66
Strain at Failure (%)	1.2
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 3/29/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-94-3-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

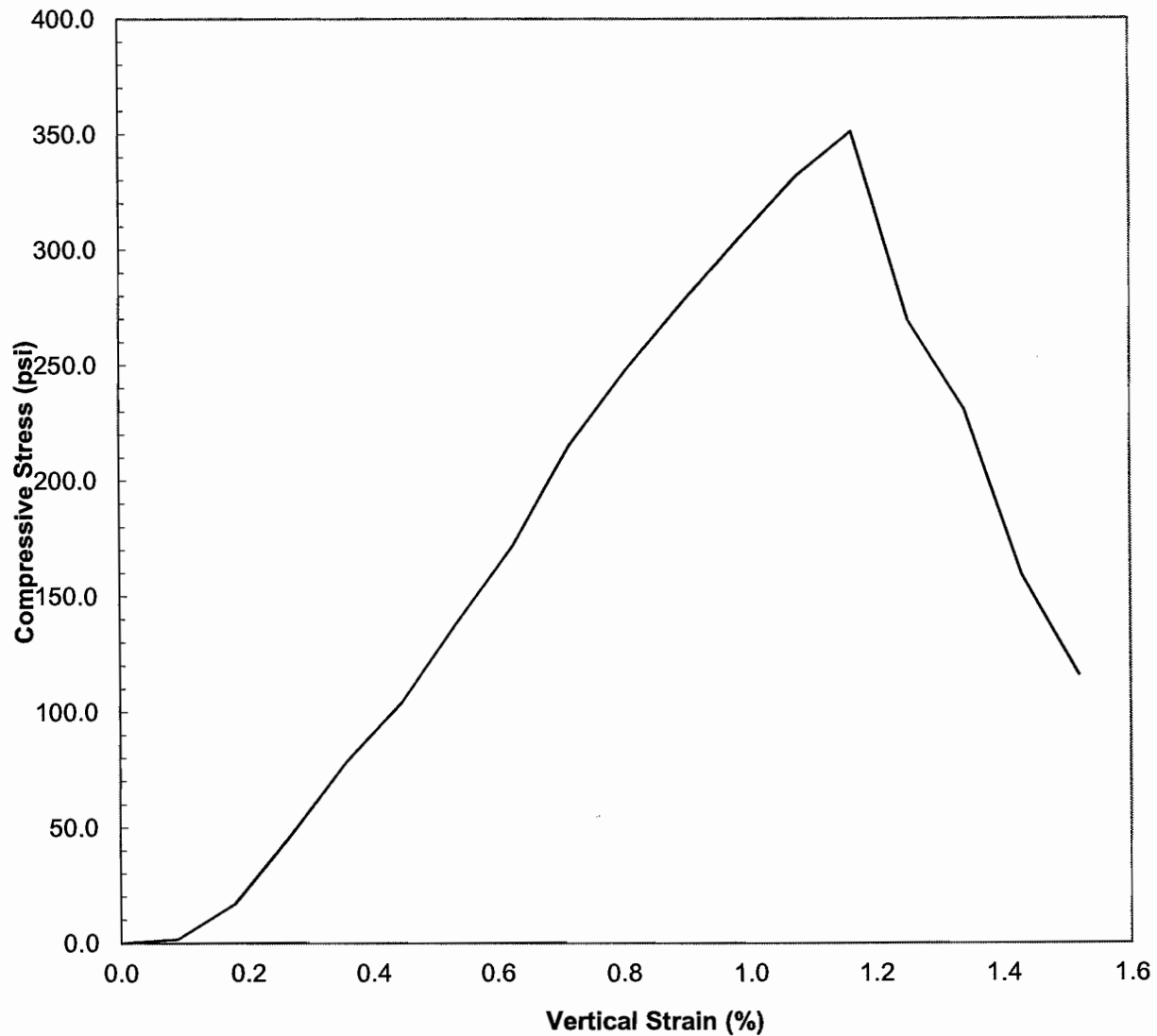
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 30-15, 7 day**

**Depth: N/A**

**ATL Sample No. AT1573S94**







# ATLANTIC TESTING LABORATORIES

**Albany**  
22 Corporate Drive  
Clifton Park, NY 12065  
518-383-9144 (T)  
518-383-9166 (F)

## TRANSMITTAL

March 30, 2011

AECOM  
40 British American Boulevard  
Latham, New York 12110

Attn: Mr. Scott Serviss

E/Mail: [scott.serviss@aecom.com](mailto:scott.serviss@aecom.com)

Re: Soil Laboratory Testing  
NGP Site  
Norwich, New York  
ATL Project No.: AT1573

Dear Mr. Serviss:

Enclosed are the following reports:

AT1573SL-95-3-11	Unconfined Compressive Strength	March 24, 2011
AT1573SL-96-3-11	Unconfined Compressive Strength	March 24, 2011

Please contact our office should you have any questions or if we may be of further service.

Sincerely,

ATLANTIC TESTING LABORATORIES, Limited

Robert E. Field  
Laboratory Manager  
[bfield@atlantictesting.com](mailto:bfield@atlantictesting.com)

REF/nd

Enclosures



# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166


ATL Report No. AT1573SL-95-3-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 27-17

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	3/22/2011
Date of Test	3/29/2011
Age of Sample at Test Date	7 Days
Initial Dry Density (pcf)	72.0
Initial Water Content (%)	45.2
Unconfined Compressive Strength (psi)	307.8
Average Height (in.)	5.669
Average Diameter (in.)	3.005
Height-to-Diameter Ratio	1.89
Average Rate of Strain (%/min)	0.65
Strain at Failure (%)	1.2
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 3/30/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-95-3-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

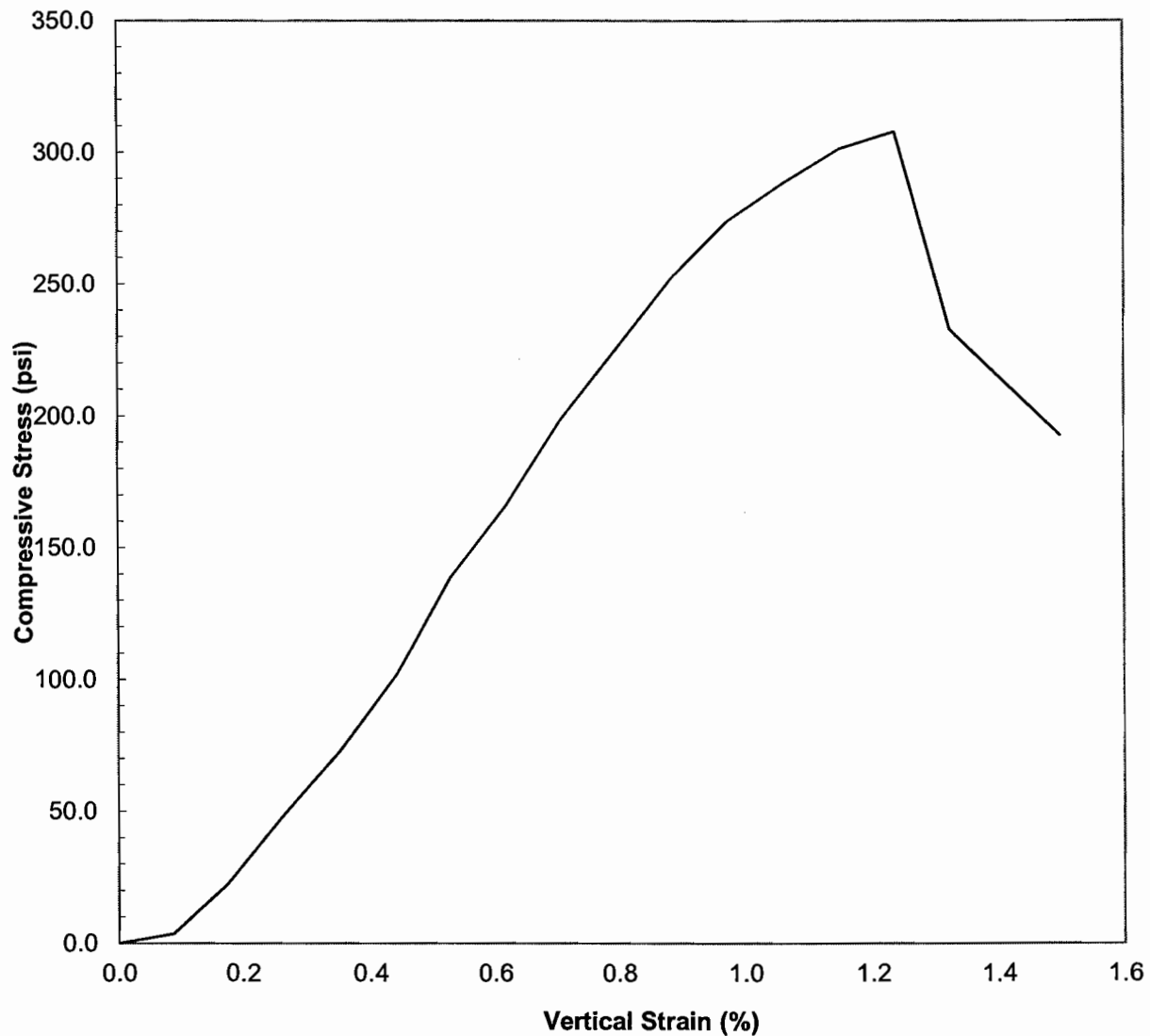
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 27-17, 7 day**

**Depth: N/A**

**ATL Sample No. AT1573S95**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166


ATL Report No. AT1573SL-96-3-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 22-18

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	3/22/2011
Date of Test	3/29/2011
Age of Sample at Test Date	7 Days
Initial Dry Density (pcf)	70.3
Initial Water Content (%)	48.8
Unconfined Compressive Strength (psi)	158.3
Average Height (in.)	5.551
Average Diameter (in.)	3.008
Height-to-Diameter Ratio	1.85
Average Rate of Strain (%/min)	0.67
Strain at Failure (%)	1.3
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 3/30/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-96-3-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

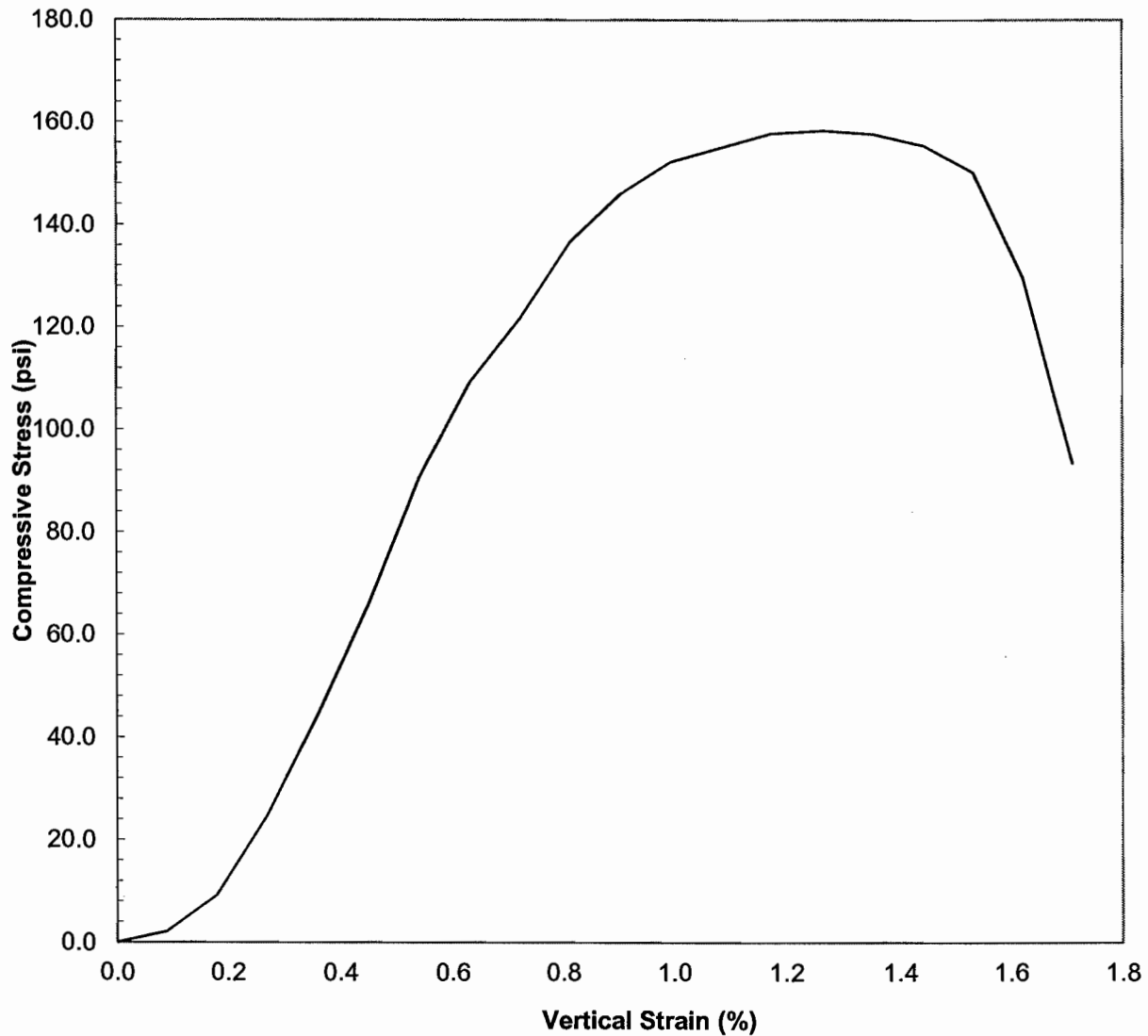
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 22-18, 7 day**

**Depth: N/A**

**ATL Sample No. AT1573S96**





# ATLANTIC TESTING LABORATORIES

**Albany**  
22 Corporate Drive  
Clifton Park, NY 12065  
518-383-9144 (T)  
518-383-9166 (F)

## TRANSMITTAL

April 4, 2011

AECOM  
40 British American Boulevard  
Latham, New York 12110

Attn: Mr. Scott Serviss

E/Mail: [scott.serviss@aecom.com](mailto:scott.serviss@aecom.com)

Re: Soil Laboratory Testing  
NGP Site  
Norwich, New York  
ATL Project No.: AT1573

Dear Mr. Serviss:

Enclosed are the following reports:

AT1573SL-97-3-11	Unconfined Compressive Strength	March 30, 2011
AT1573SL-98-3-11	Unconfined Compressive Strength	March 30, 2011
AT1573SL-99-3-11	Unconfined Compressive Strength	March 30, 2011
AT1573SL-100-3-11	Unconfined Compressive Strength	March 30, 2011
AT1573SL-60A-2-11	Hydraulic Conductivity	March 2, 2011
AT1573SL-61A-2-11	Hydraulic Conductivity	March 2, 2011
AT1573SL-62A-2-11	Hydraulic Conductivity	March 2, 2011
AT1573SL-63A-2-11	Hydraulic Conductivity	March 2, 2011
AT1573SL-64A-2-11	Hydraulic Conductivity	March 2, 2011
AT1573SL-65A-2-11	Hydraulic Conductivity	March 2, 2011

Please contact our office should you have any questions or if we may be of further service.

Sincerely,

ATLANTIC TESTING LABORATORIES, Limited

Robert E. Field  
Laboratory Manager  
[bfield@atlantictesting.com](mailto:bfield@atlantictesting.com)

REF/nd

Enclosures



# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

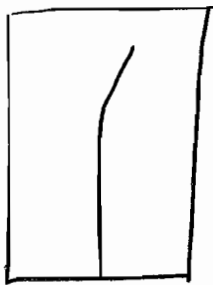
ATL Report No. AT1573SL-97-3-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 17-16

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	3/23/2011
Date of Test	4/1/2011
Age of Sample at Test Date	9 Days
Initial Dry Density (pcf)	72.1
Initial Water Content (%)	46.6
Unconfined Compressive Strength (psi)	161.8
Average Height (in.)	5.551
Average Diameter (in.)	3.005
Height-to-Diameter Ratio	1.85
Average Rate of Strain (%/min)	0.67
Strain at Failure (%)	1.4
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 4/4/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-97-3-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

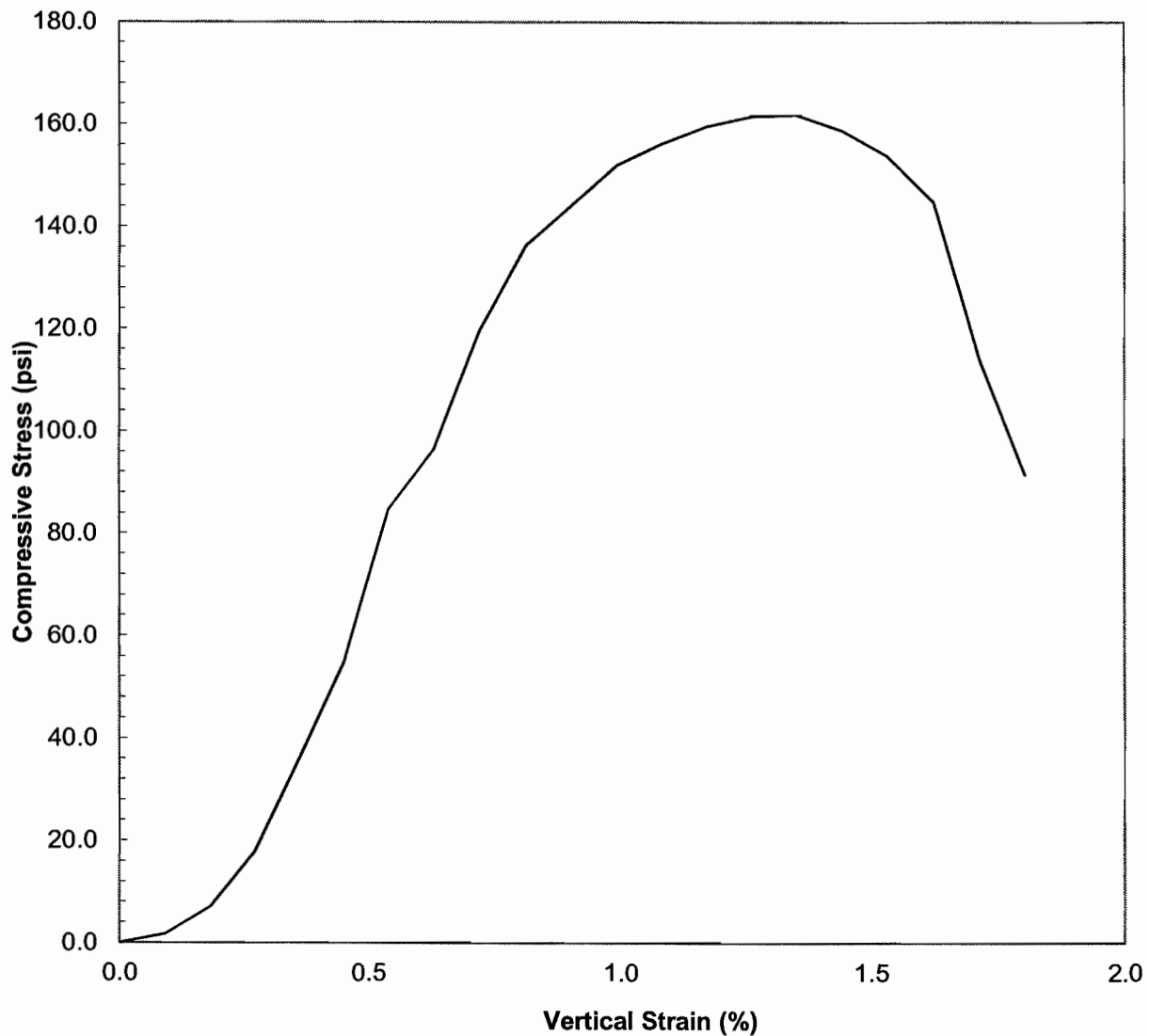
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 17-16, 9 day**

**Depth: N/A**

**ATL Sample No. AT1573S97**







# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

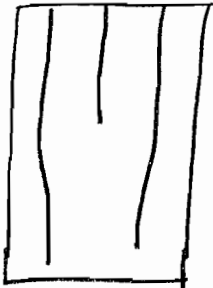
ATL Report No. AT1573SL-98-3-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 15-16

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	3/24/2011
Date of Test	4/1/2011
Age of Sample at Test Date	8 Days
Initial Dry Density (pcf)	76.2
Initial Water Content (%)	42.6
Unconfined Compressive Strength (psi)	234.2
Average Height (in.)	5.669
Average Diameter (in.)	3.005
Height-to-Diameter Ratio	1.89
Average Rate of Strain (%/min)	0.65
Strain at Failure (%)	1.3
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 4/4/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-98-3-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

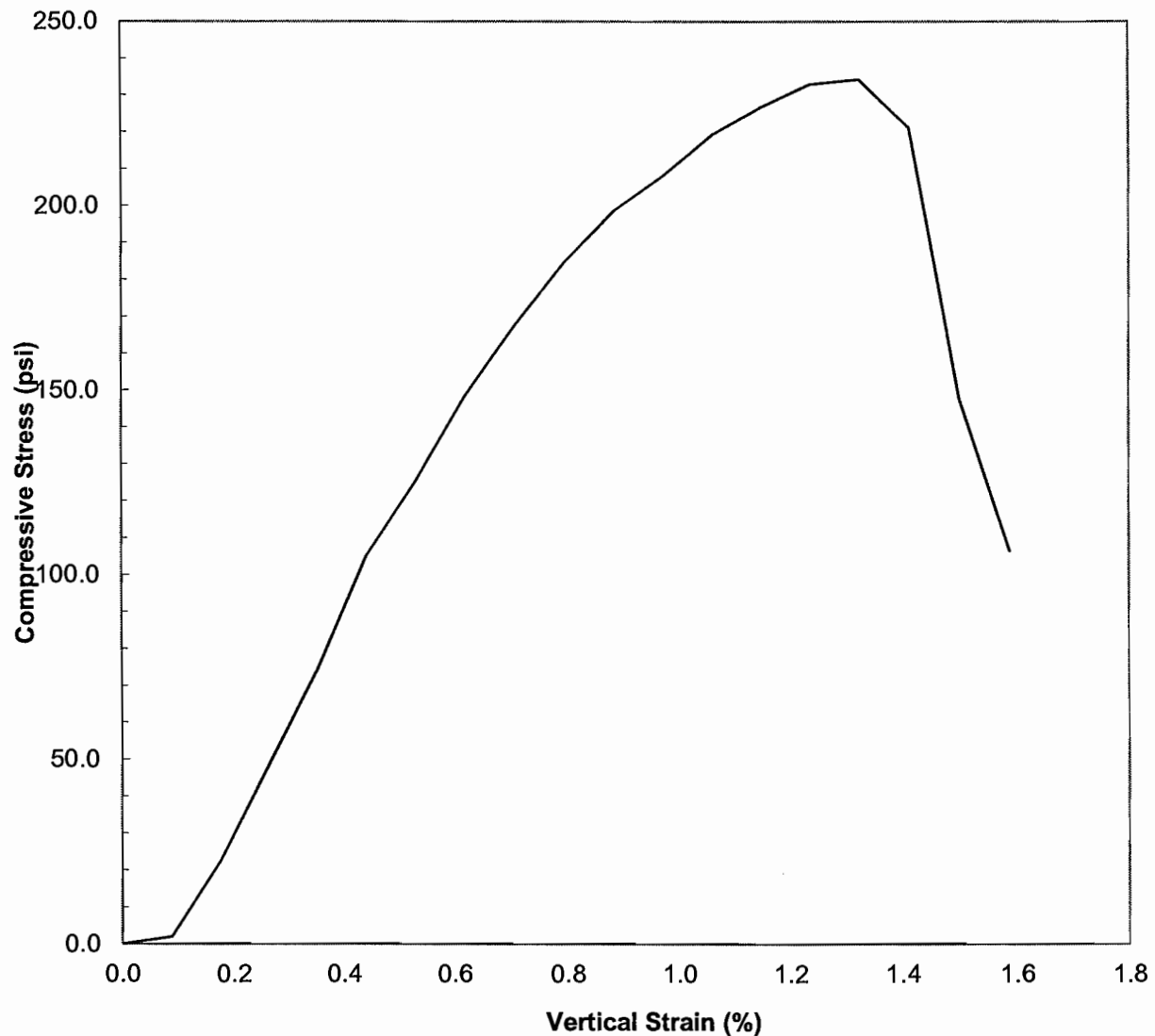
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 15-16, 8 day**

**Depth: N/A**

**ATL Sample No. AT1573S98**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

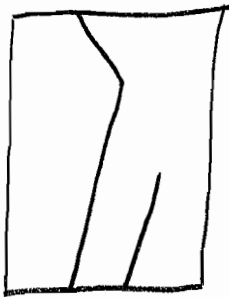
ATL Report No. AT1573SL-99-3-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 16-21

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	3/24/2011
Date of Test	4/1/2011
Age of Sample at Test Date	8 Days
Initial Dry Density (pcf)	77.6
Initial Water Content (%)	41.3
Unconfined Compressive Strength (psi)	130.8
Average Height (in.)	5.472
Average Diameter (in.)	3.008
Height-to-Diameter Ratio	1.82
Average Rate of Strain (%/min)	0.68
Strain at Failure (%)	1.1
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 4/4/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-99-3-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

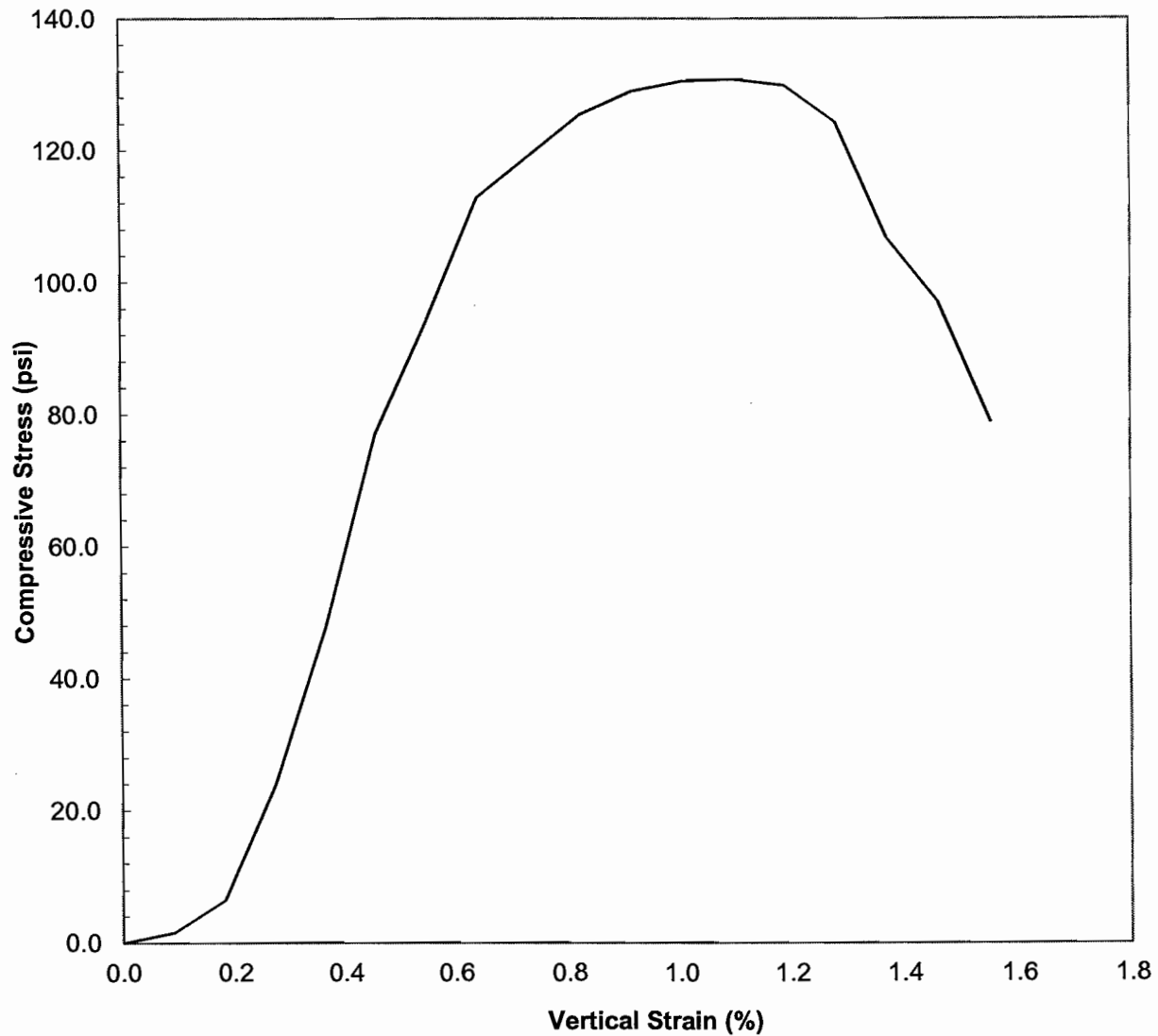
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 16-21, 8 day**

**Depth: N/A**

**ATL Sample No. AT1573S99**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

ATL Report No. AT1573SL-100-3-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 13-24

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	3/25/2011
Date of Test	4/1/2011
Age of Sample at Test Date	7 Days
Initial Dry Density (pcf)	73.6
Initial Water Content (%)	45.2
Unconfined Compressive Strength (psi)	146.5
Average Height (in.)	5.551
Average Diameter (in.)	3.007
Height-to-Diameter Ratio	1.85
Average Rate of Strain (%/min)	0.67
Strain at Failure (%)	1.4
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: [Signature]

Date: 4/4/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-100-3-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

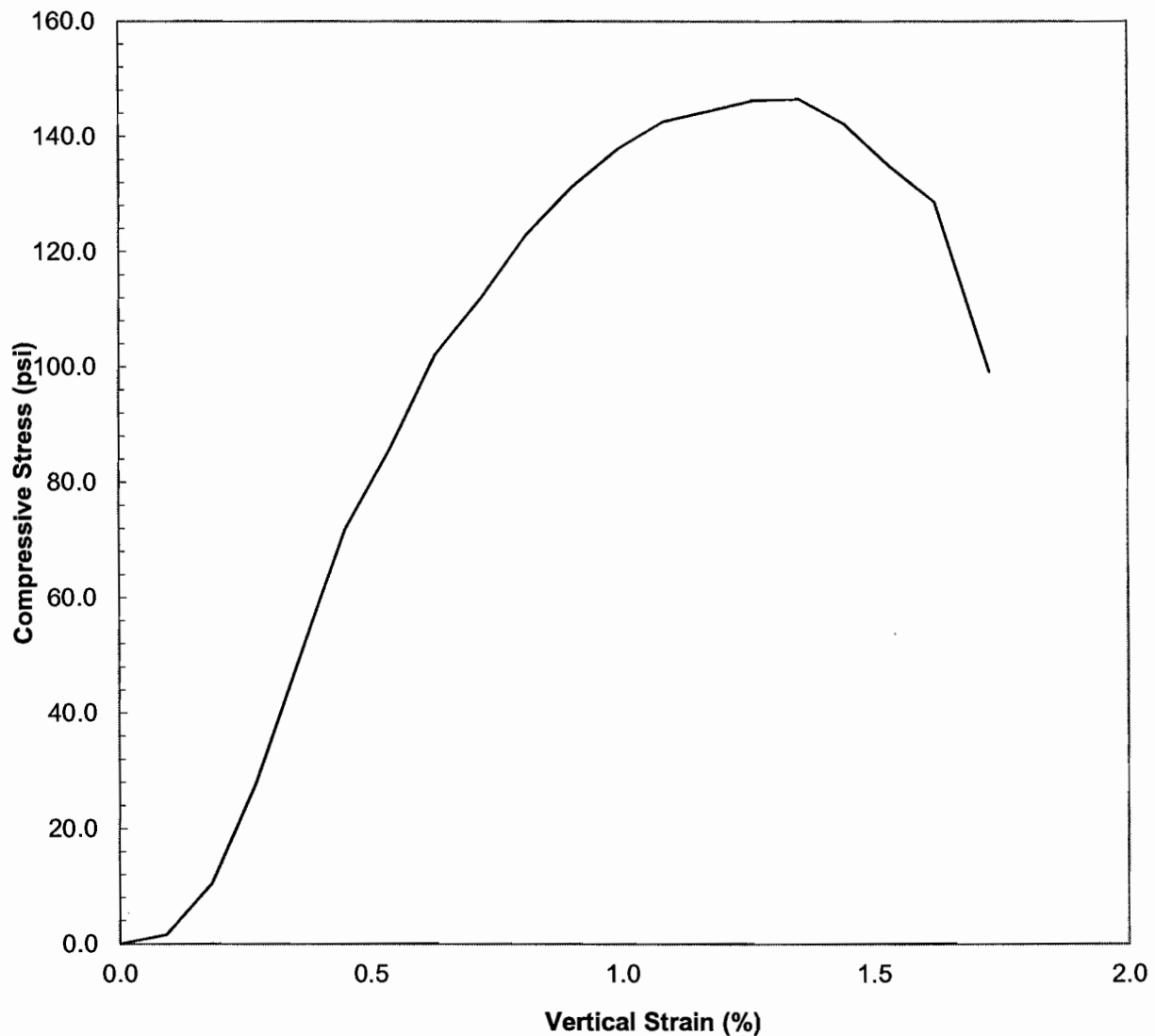
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 13-24, 7 day**

**Depth: N/A**

**ATL Sample No. AT1573S100**





# ATLANTIC TESTING LABORATORIES

**Albany**  
22 Corporate Drive  
Clifton Park, NY 12065  
518-383-9144 (T)  
518-383-9166 (F)

## TRANSMITTAL

April 6, 2011

AECOM  
40 British American Boulevard  
Latham, New York 12110

Attn: Mr. Scott Serviss

E/Mail: [scott.serviss@aecom.com](mailto:scott.serviss@aecom.com)

Re: Soil Laboratory Testing  
NGP Site  
Norwich, New York  
ATL Project No.: AT1573

Dear Mr. Serviss:

Enclosed are the following reports:

AT1573SL-76A-3-11	Unconfined Compressive Strength	March 10, 2011
AT1573SL-101-3-11	Unconfined Compressive Strength	March 30, 2011
AT1573SL-102-3-11	Unconfined Compressive Strength	March 30, 2011
AT1573SL-103-3-11	Unconfined Compressive Strength	March 30, 2011
AT1573SL-66A-2-11	Hydraulic Conductivity	March 10, 2011
AT1573SL-67A-2-11	Hydraulic Conductivity	March 10, 2011
AT1573SL-68A-2-11	Hydraulic Conductivity	March 10, 2011
AT1573SL-69A-2-11	Hydraulic Conductivity	March 10, 2011
AT1573SL-70A-2-11	Hydraulic Conductivity	March 10, 2011
AT1573SL-71A-2-11	Hydraulic Conductivity	March 10, 2011

Please contact our office should you have any questions or if we may be of further service.

Sincerely,

ATLANTIC TESTING LABORATORIES, Limited

Robert E. Field  
Laboratory Manager  
[bfield@atlantictesting.com](mailto:bfield@atlantictesting.com)

REF/nd

Enclosures



# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166


ATL Report No. AT1573SL-76A-3-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 18-11

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	3/2/2011
Date of Test	4/4/2011
Age of Sample at Test Date	33 Days
Initial Dry Density (pcf)	73.6
Initial Water Content (%)	46.9
Unconfined Compressive Strength (psi)	69.1
Average Height (in.)	5.315
Average Diameter (in.)	2.996
Height-to-Diameter Ratio	1.77
Average Rate of Strain (%/min)	0.70
Strain at Failure (%)	1.3
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 4/6/11





# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-76A-3-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

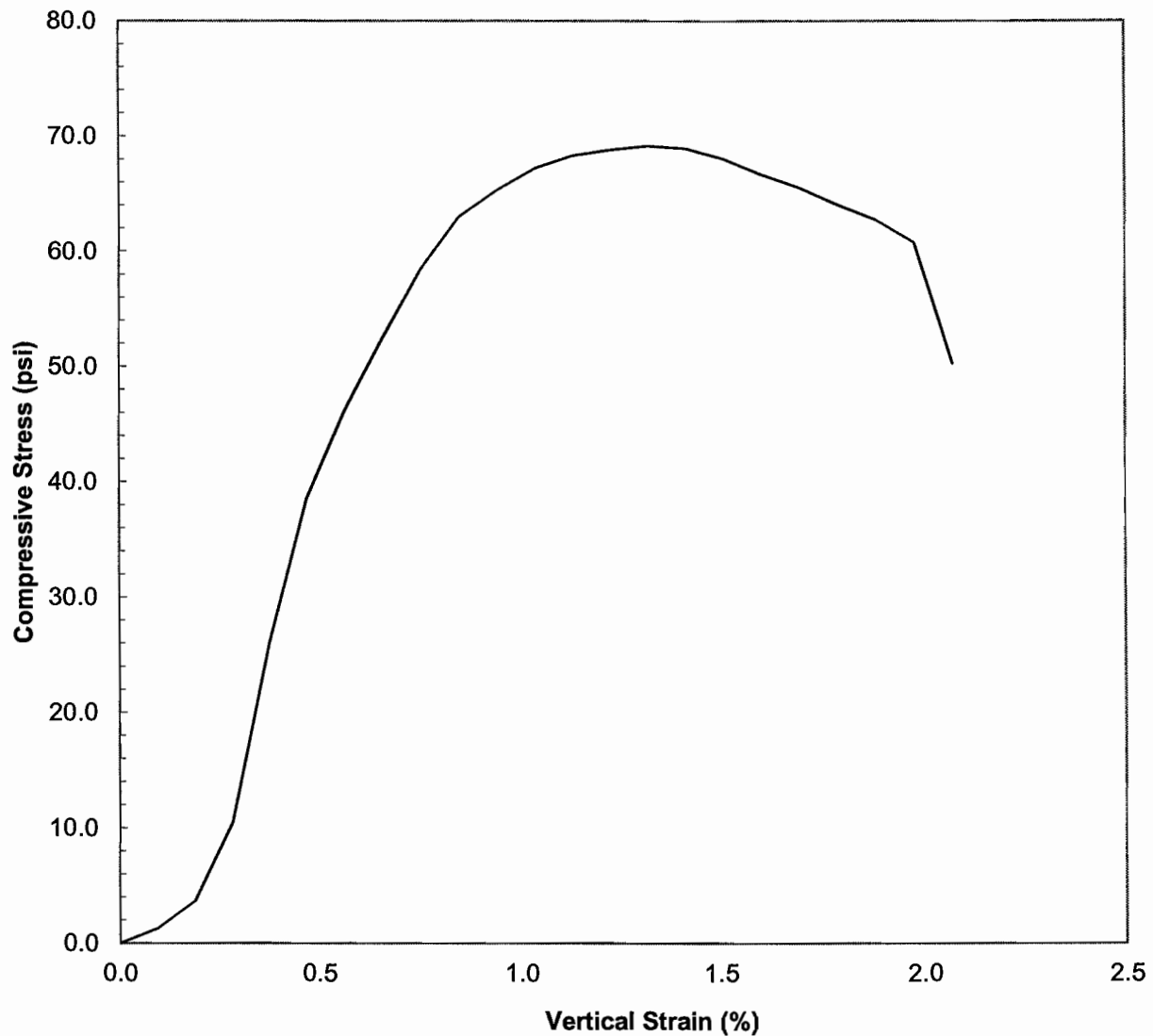
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 18-11, 33 day**

**Depth: N/A**

**ATL Sample No. AT1573S76**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

ATL Report No. AT1573SL-101-3-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 2-6

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	3/28/2011
Date of Test	4/4/2011
Age of Sample at Test Date	7 Days
Initial Dry Density (pcf)	90.9
Initial Water Content (%)	29.7
Unconfined Compressive Strength (psi)	183.5
Average Height (in.)	5.472
Average Diameter (in.)	3.009
Height-to-Diameter Ratio	1.82
Average Rate of Strain (%/min)	0.68
Strain at Failure (%)	1.2
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: REF

Date: 4/6/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-101-3-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

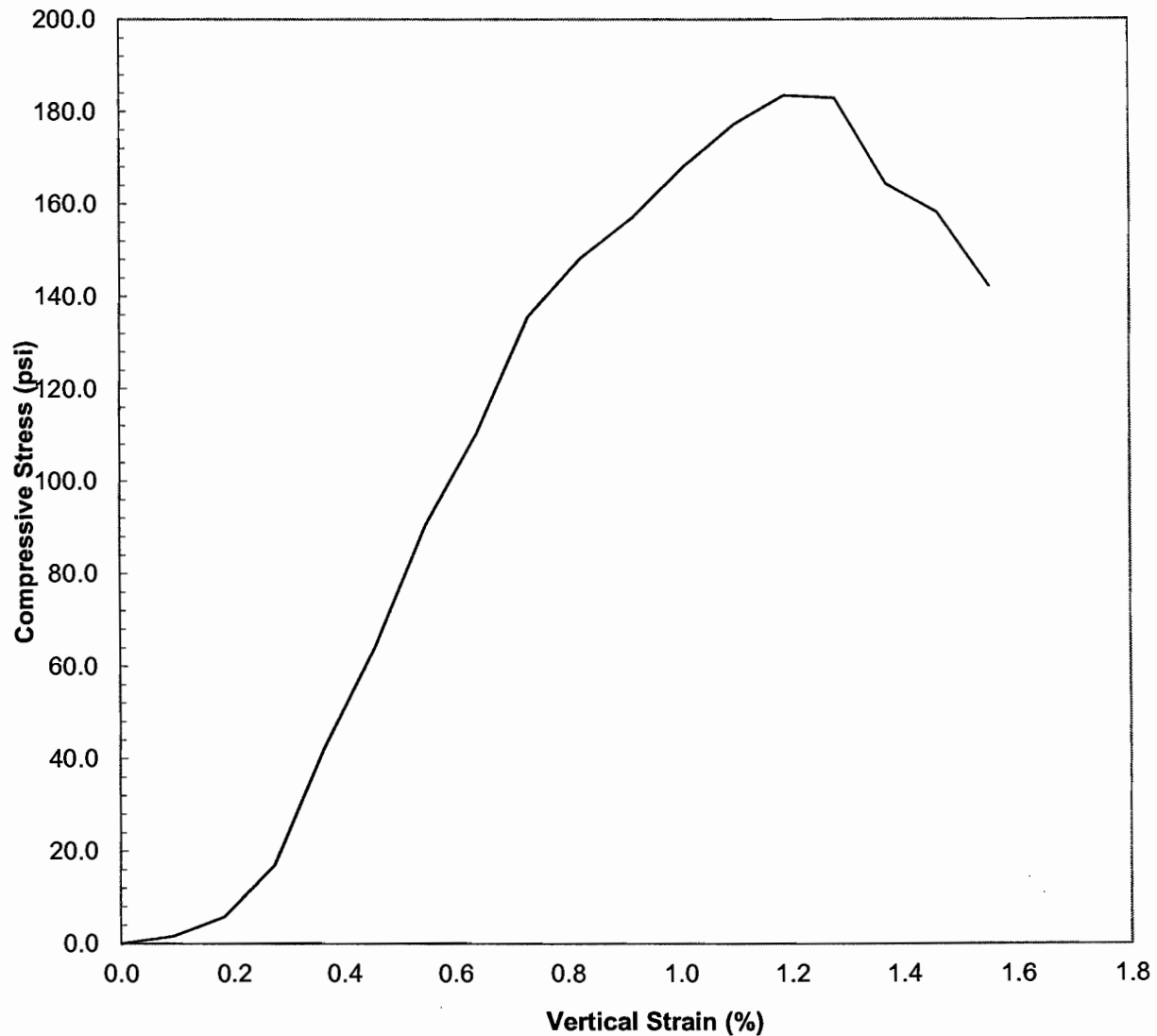
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 2-6, 7 day**

**Depth: N/A**

**ATL Sample No. AT1573S101**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

ATL Report No. AT1573SL-102-3-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 4-7

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	3/28/2011
Date of Test	4/4/2011
Age of Sample at Test Date	7 Days
Initial Dry Density (pcf)	90.9
Initial Water Content (%)	29.1
Unconfined Compressive Strength (psi)	208.2
Average Height (in.)	5.669
Average Diameter (in.)	3.004
Height-to-Diameter Ratio	1.89
Average Rate of Strain (%/min)	0.65
Strain at Failure (%)	1.1
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by:

Date: 4/6/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-102-3-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

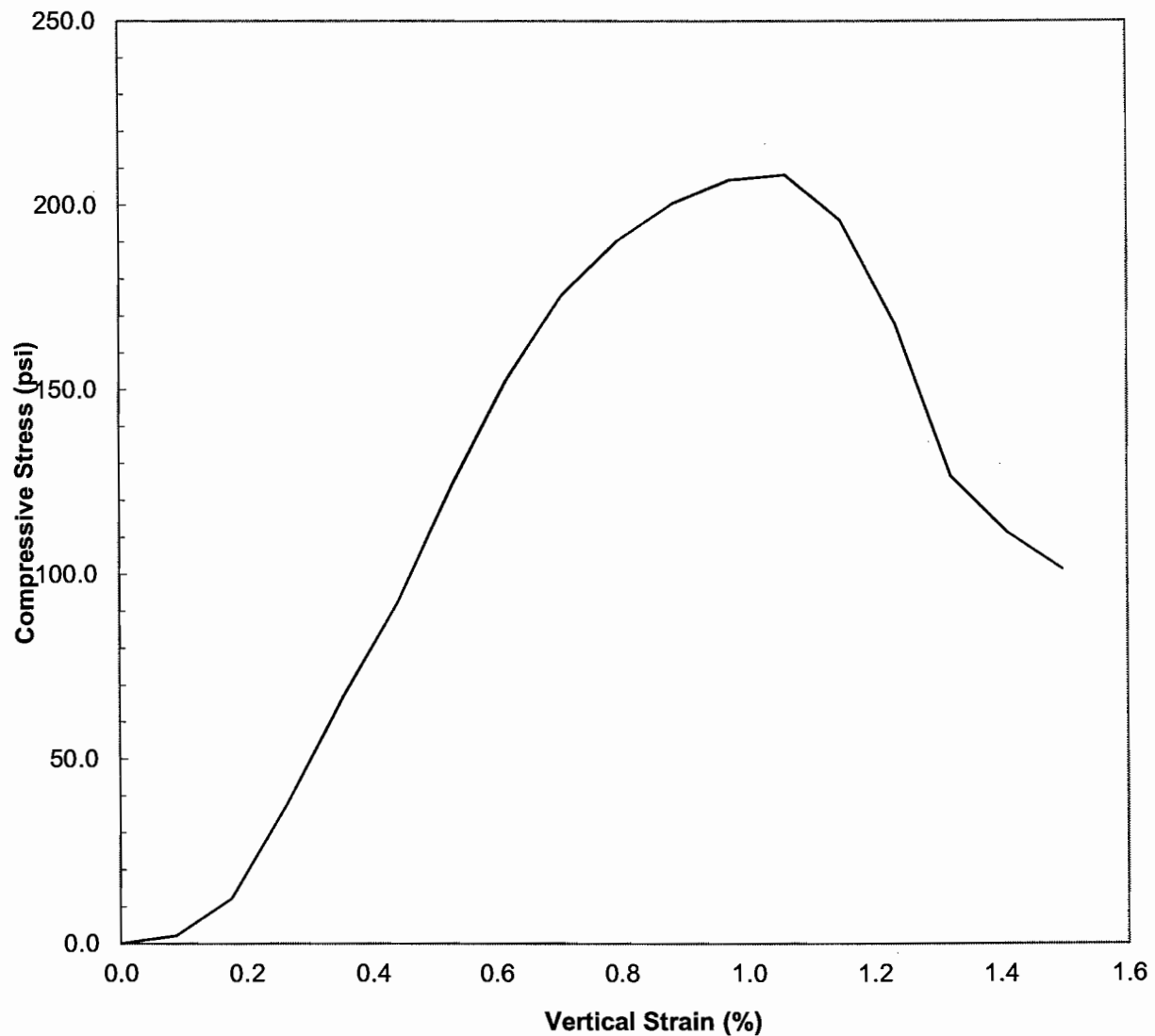
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 4-7, 7 day**

**Depth: N/A**

**ATL Sample No. AT1573S102**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

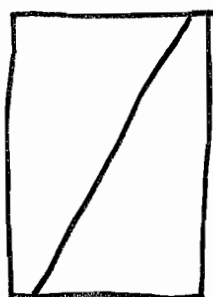
ATL Report No. AT1573SL-103-3-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 13-17

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	3/26/2011
Date of Test	4/4/2011
Age of Sample at Test Date	9 Days
Initial Dry Density (pcf)	78.1
Initial Water Content (%)	39.7
Unconfined Compressive Strength (psi)	150.2
Average Height (in.)	5.472
Average Diameter (in.)	3.007
Height-to-Diameter Ratio	1.82
Average Rate of Strain (%/min)	0.68
Strain at Failure (%)	1.2
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 4/6/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-103-3-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

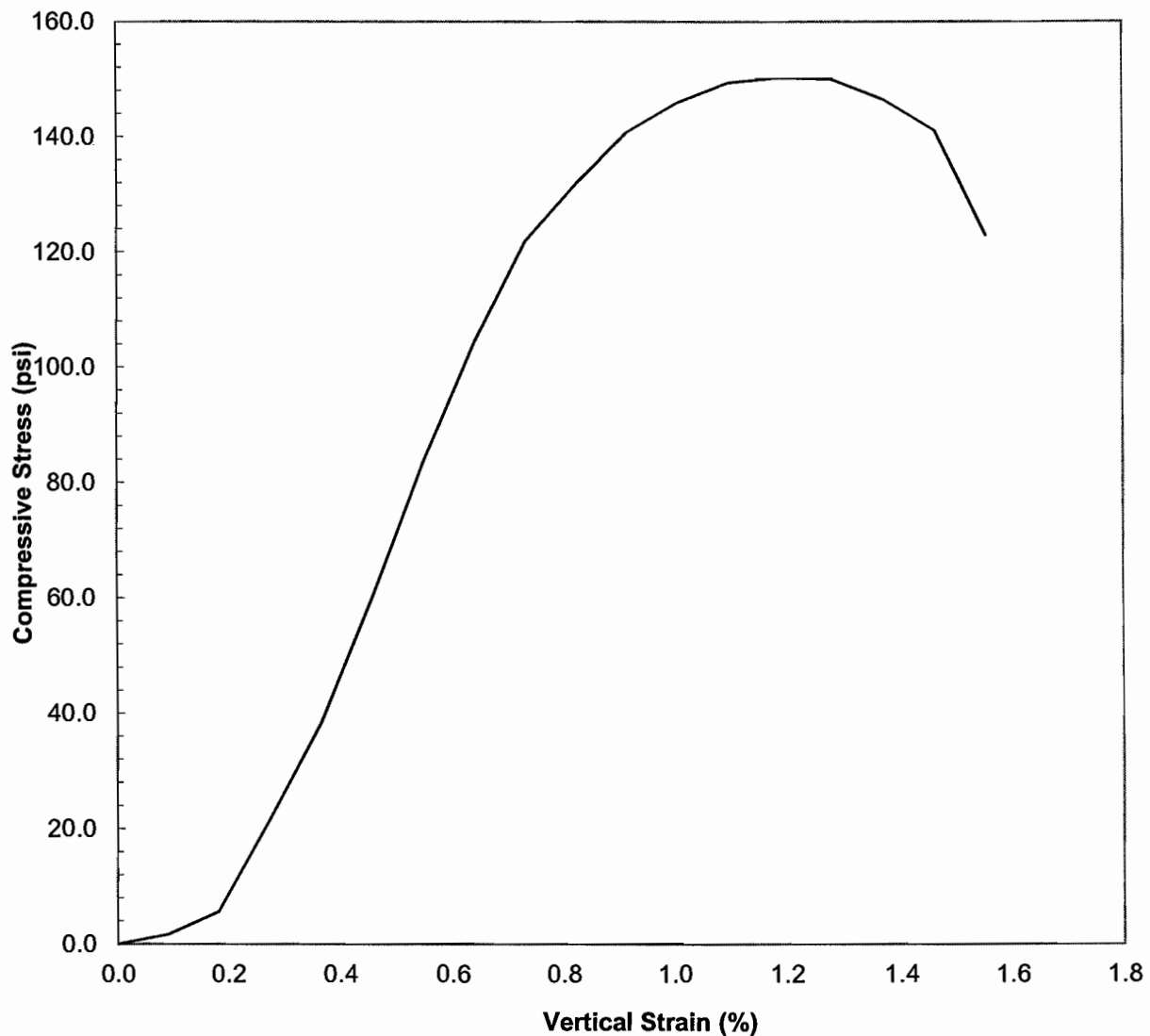
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 13-17, 9 day**

**Depth: N/A**

**ATL Sample No. AT1573S103**





# ATLANTIC TESTING LABORATORIES

**Albany**  
22 Corporate Drive  
Clifton Park, NY 12065  
518-383-9144 (T)  
518-383-9166 (F)

## TRANSMITTAL

April 8, 2011

AECOM  
40 British American Boulevard  
Latham, New York 12110

Attn: Mr. Scott Serviss

E/Mail: [scott.serviss@aecom.com](mailto:scott.serviss@aecom.com)

Re: Soil Laboratory Testing  
NGP Site  
Norwich, New York  
ATL Project No.: AT1573

Dear Mr. Serviss:

Enclosed are the following reports:

AT1573SL-104-4-11	Unconfined Compressive Strength	April 6, 2011
AT1573SL-105-4-11	Unconfined Compressive Strength	April 6, 2011
AT1573SL-106-4-11	Unconfined Compressive Strength	April 6, 2011
AT1573SL-107-43-11	Unconfined Compressive Strength	April 6, 2011
AT1573SL-48B-2-11	Hydraulic Conductivity	March 24, 2011
AT1573SL-73A-3-11	Hydraulic Conductivity	March 16, 2011
AT1573SL-74A-3-11	Hydraulic Conductivity	March 16, 2011
AT1573SL-75A-3-11	Hydraulic Conductivity	March 16, 2011
AT1573SL-76B-3-11	Hydraulic Conductivity	March 16, 2011
AT1573SL-79A-3-11	Hydraulic Conductivity	March 16, 2011

Please contact our office should you have any questions or if we may be of further service.

Sincerely,

ATLANTIC TESTING LABORATORIES, Limited

Robert E. Field  
Laboratory Manager  
[bfield@atlantictesting.com](mailto:bfield@atlantictesting.com)

REF/nd

Enclosures





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

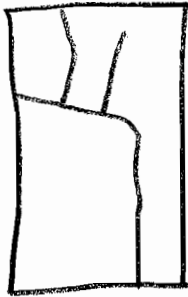
ATL Report No. AT1573SL-104-4-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 5-16

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	3/29/2011
Date of Test	4/7/2011
Age of Sample at Test Date	9 Days
Initial Dry Density (pcf)	77.4
Initial Water Content (%)	41.5
Unconfined Compressive Strength (psi)	238.0
Average Height (in.)	5.709
Average Diameter (in.)	3.003
Height-to-Diameter Ratio	1.90
Average Rate of Strain (%/min)	0.65
Strain at Failure (%)	1.2
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 4/8/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-104-4-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

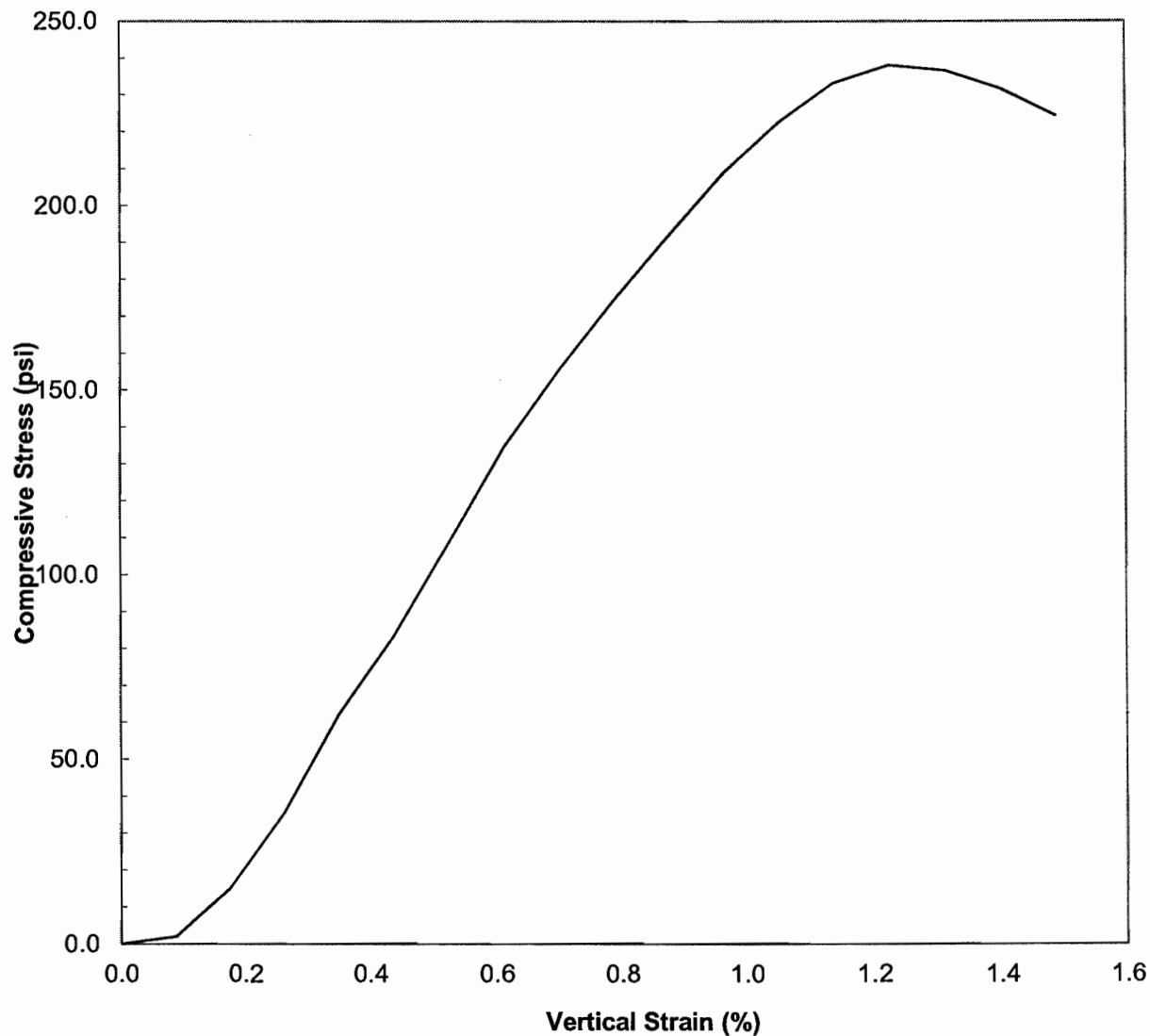
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 5-16, 9 day**

**Depth: N/A**

**ATL Sample No. AT1573S104**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

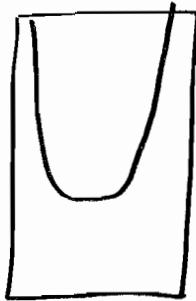
ATL Report No. AT1573SL-105-4-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 11-29

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	3/30/2011
Date of Test	4/7/2011
Age of Sample at Test Date	8 Days
Initial Dry Density (pcf)	77.0
Initial Water Content (%)	42.0
Unconfined Compressive Strength (psi)	110.9
Average Height (in.)	5.591
Average Diameter (in.)	3.007
Height-to-Diameter Ratio	1.86
Average Rate of Strain (%/min)	0.66
Strain at Failure (%)	1.3
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 4/8/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-105-4-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

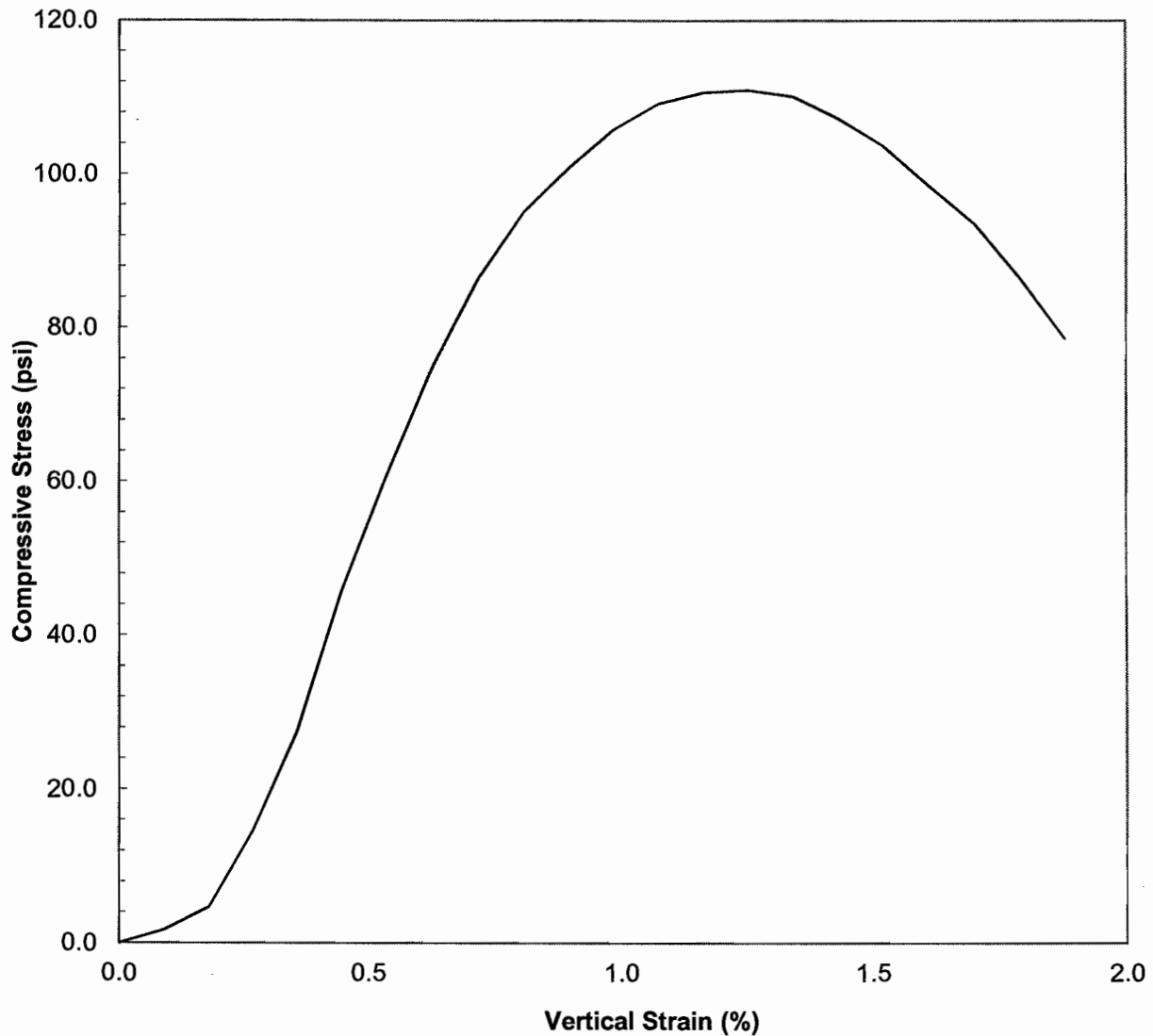
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 11-29, 8 day**

**Depth: N/A**

**ATL Sample No. AT1573S105**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166


ATL Report No. AT1573SL-106-4-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 10-28

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	3/31/2011
Date of Test	4/7/2011
Age of Sample at Test Date	7 Days
Initial Dry Density (pcf)	74.0
Initial Water Content (%)	45.0
Unconfined Compressive Strength (psi)	125.9
Average Height (in.)	5.512
Average Diameter (in.)	3.007
Height-to-Diameter Ratio	1.83
Average Rate of Strain (%/min)	0.67
Strain at Failure (%)	1.1
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 4/8/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-106-4-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

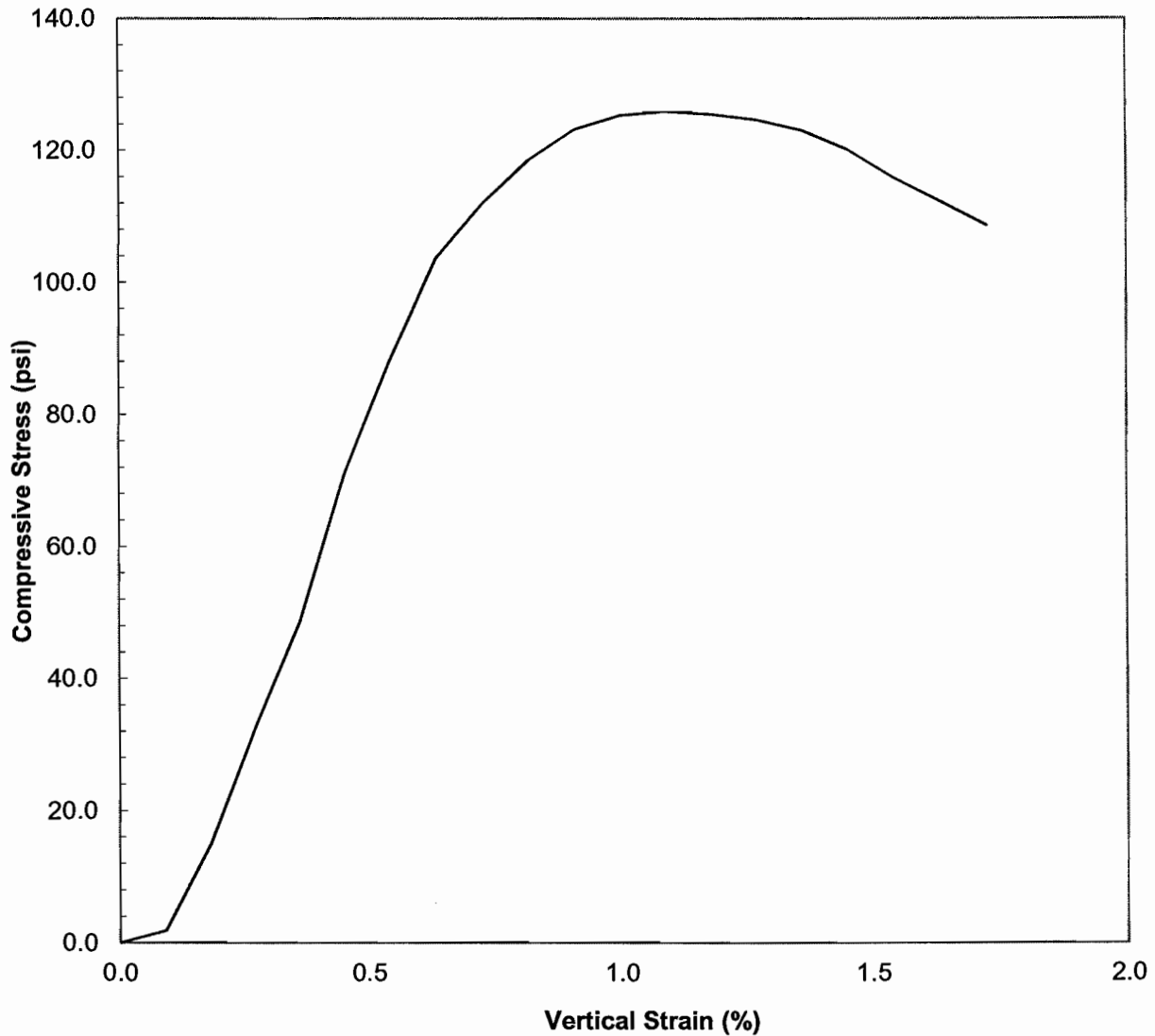
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 10-28, 7 day**

**Depth: N/A**

**ATL Sample No. AT1573S106**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

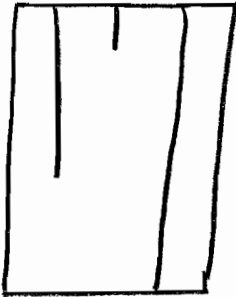
ATL Report No. AT1573SL-107-4-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 6-26

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	3/31/2011
Date of Test	4/7/2011
Age of Sample at Test Date	7 Days
Initial Dry Density (pcf)	75.2
Initial Water Content (%)	44.3
Unconfined Compressive Strength (psi)	143.1
Average Height (in.)	5.394
Average Diameter (in.)	3.001
Height-to-Diameter Ratio	1.80
Average Rate of Strain (%/min)	0.69
Strain at Failure (%)	1.3
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 4/8/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-107-4-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

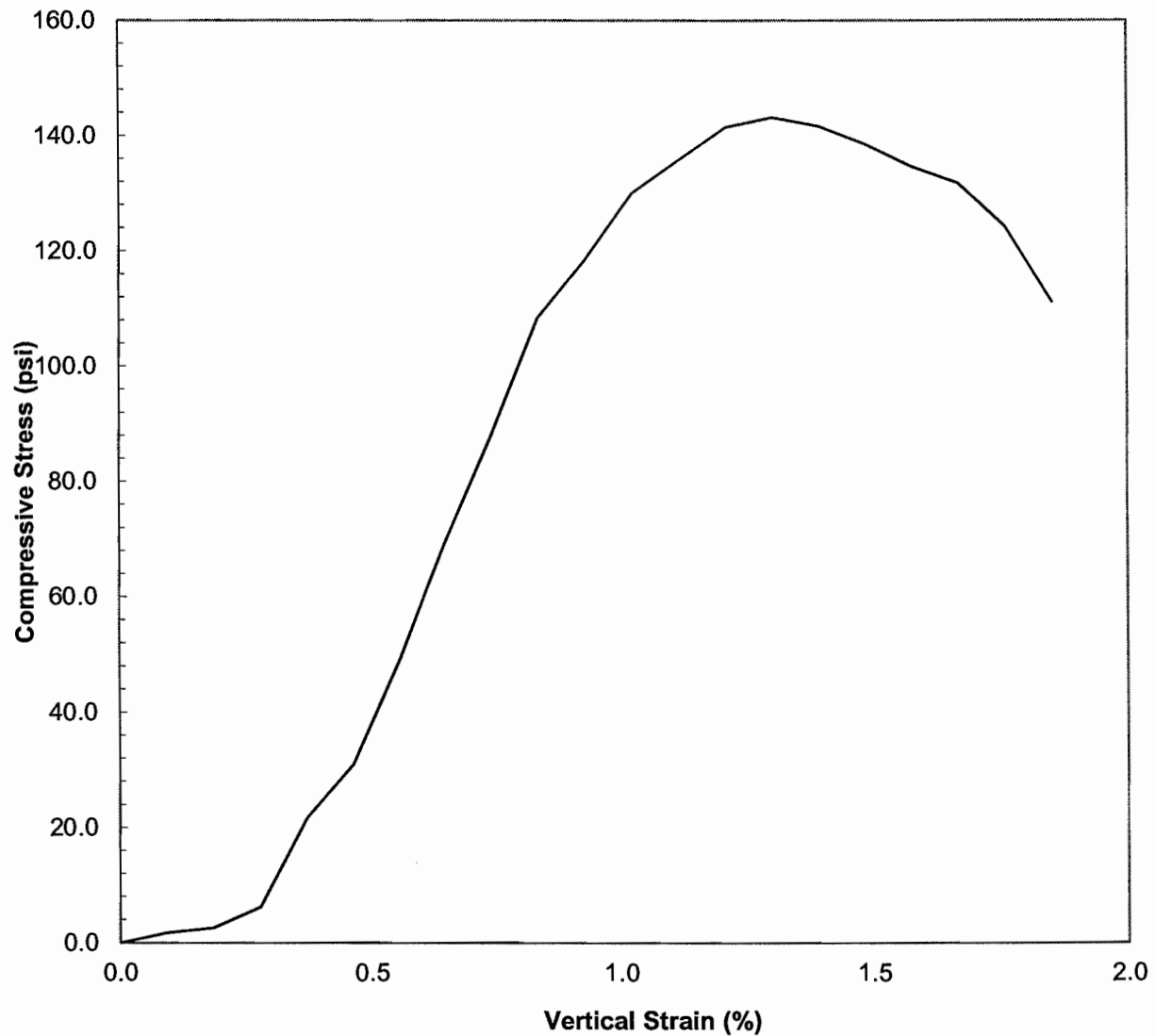
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 6-26, 7 day**

**Depth: N/A**

**ATL Sample No. AT1573S107**







# ATLANTIC TESTING LABORATORIES

## Albany

22 Corporate Drive  
Clifton Park, NY 12065  
518-383-9144 (T)  
518-383-9166 (F)

## TRANSMITTAL

April 13, 2011

AECOM  
40 British American Boulevard  
Latham, New York 12110

Attn: Mr. Scott Serviss

E/Mail: [scott.serviss@aecom.com](mailto:scott.serviss@aecom.com)

Re: Soil Laboratory Testing  
NGP Site  
Norwich, New York  
ATL Project No.: AT1573

Dear Mr. Serviss:

Enclosed are the following reports:

AT1573SL-108-4-11	Unconfined Compressive Strength	April 6, 2011
AT1573SL-109-4-11	Unconfined Compressive Strength	April 6, 2011
AT1573SL-110-4-11	Unconfined Compressive Strength	April 6, 2011
AT1573SL-111-4-11	Unconfined Compressive Strength	April 6, 2011
AT1573SL-72A-2-11	Hydraulic Conductivity	March 16, 2011
AT1573SL-77A-3-11	Hydraulic Conductivity	March 16, 2011
AT1573SL-78A-3-11	Hydraulic Conductivity	March 16, 2011

Please contact our office should you have any questions or if we may be of further service.

Sincerely,

ATLANTIC TESTING LABORATORIES, Limited

Robert E. Field  
Laboratory Manager  
[bfield@atlantictesting.com](mailto:bfield@atlantictesting.com)

REF/nd

Enclosures



# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

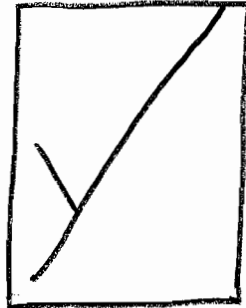
ATL Report No. AT1573SL-108-4-11

Client: AECOM


Project: NGP Site, Norwich, New York

Sample ID.: 12-25

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	4/1/2011
Date of Test	4/11/2011
Age of Sample at Test Date	10 Days
Initial Dry Density (pcf)	71.7
Initial Water Content (%)	47.7
Unconfined Compressive Strength (psi)	143.3
Average Height (in.)	5.591
Average Diameter (in.)	3.007
Height-to-Diameter Ratio	1.86
Average Rate of Strain (%/min)	0.66
Strain at Failure (%)	1.2
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 4/13/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-108-4-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

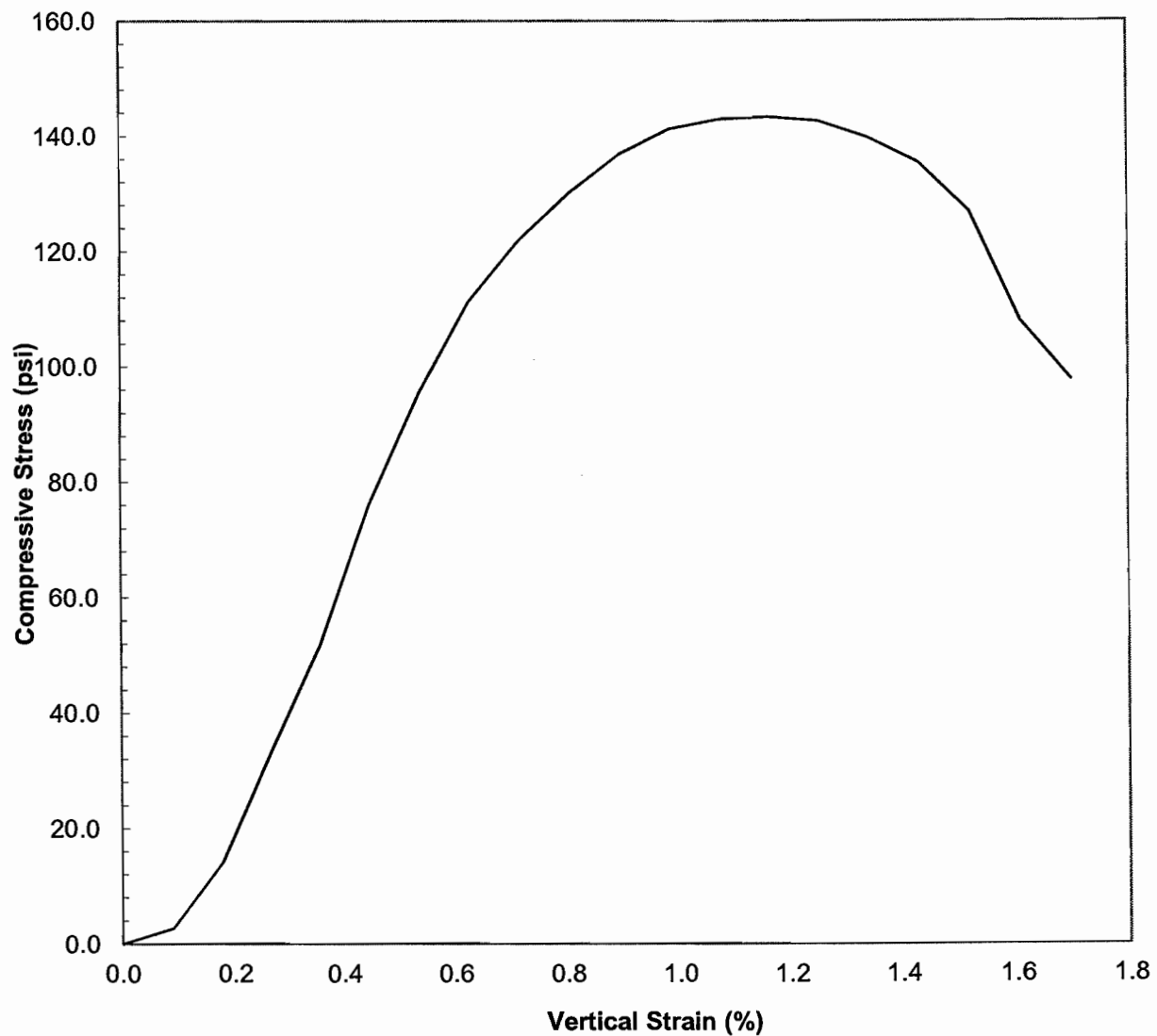
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 12-25, 10 day**

**Depth: N/A**

**ATL Sample No. AT1573S108**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

ATL Report No. AT1573SL-109-4-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 10-24

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	4/2/2011
Date of Test	4/11/2011
Age of Sample at Test Date	9 Days
Initial Dry Density (pcf)	72.1
Initial Water Content (%)	48.3
Unconfined Compressive Strength (psi)	115.3
Average Height (in.)	5.709
Average Diameter (in.)	3.007
Height-to-Diameter Ratio	1.90
Average Rate of Strain (%/min)	0.65
Strain at Failure (%)	1.1
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by:

Date: 4/13/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-109-4-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

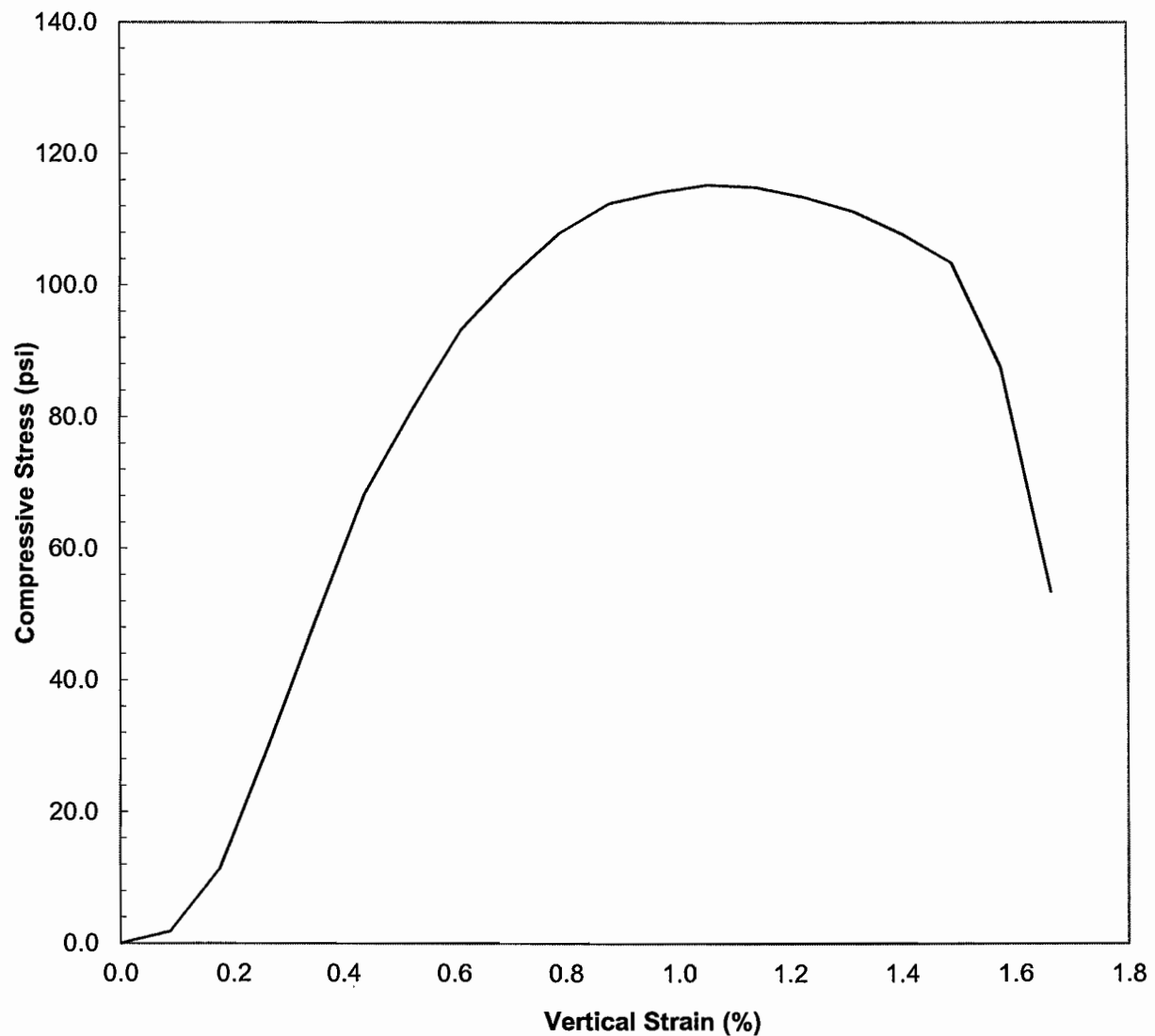
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 10-24, 9 day**

**Depth: N/A**

**ATL Sample No. AT1573S109**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

ATL Report No. AT1573SL-110-4-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 6-22

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	4/2/2011
Date of Test	4/11/2011
Age of Sample at Test Date	9 Days
Initial Dry Density (pcf)	86.5
Initial Water Content (%)	33.1
Unconfined Compressive Strength (psi)	228.7
Average Height (in.)	5.827
Average Diameter (in.)	3.009
Height-to-Diameter Ratio	1.94
Average Rate of Strain (%/min)	0.63
Strain at Failure (%)	1.1
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by:

Date: 4/13/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-110-4-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

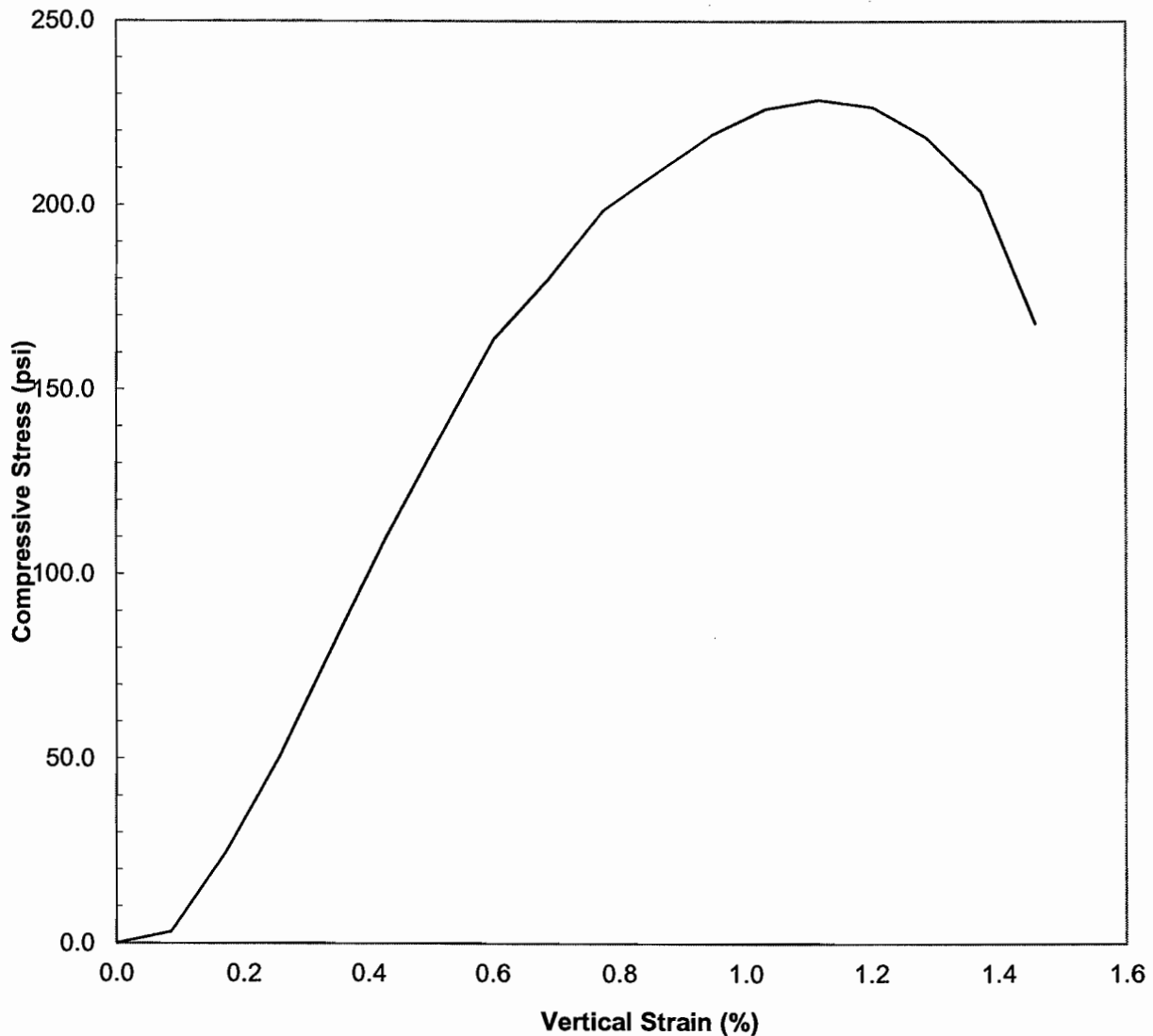
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 6-22, 9 day**

**Depth: N/A**

**ATL Sample No. AT1573S110**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

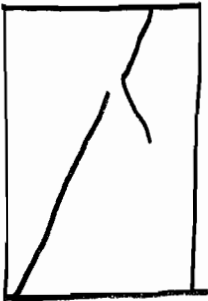
ATL Report No. AT1573SL-111-4-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 7-21

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	4/4/2011
Date of Test	4/11/2011
Age of Sample at Test Date	7 Days
Initial Dry Density (pcf)	79.4
Initial Water Content (%)	40.4
Unconfined Compressive Strength (psi)	124.6
Average Height (in.)	5.472
Average Diameter (in.)	3.004
Height-to-Diameter Ratio	1.82
Average Rate of Strain (%/min)	0.68
Strain at Failure (%)	1.1
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 4/13/11





# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-111-4-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

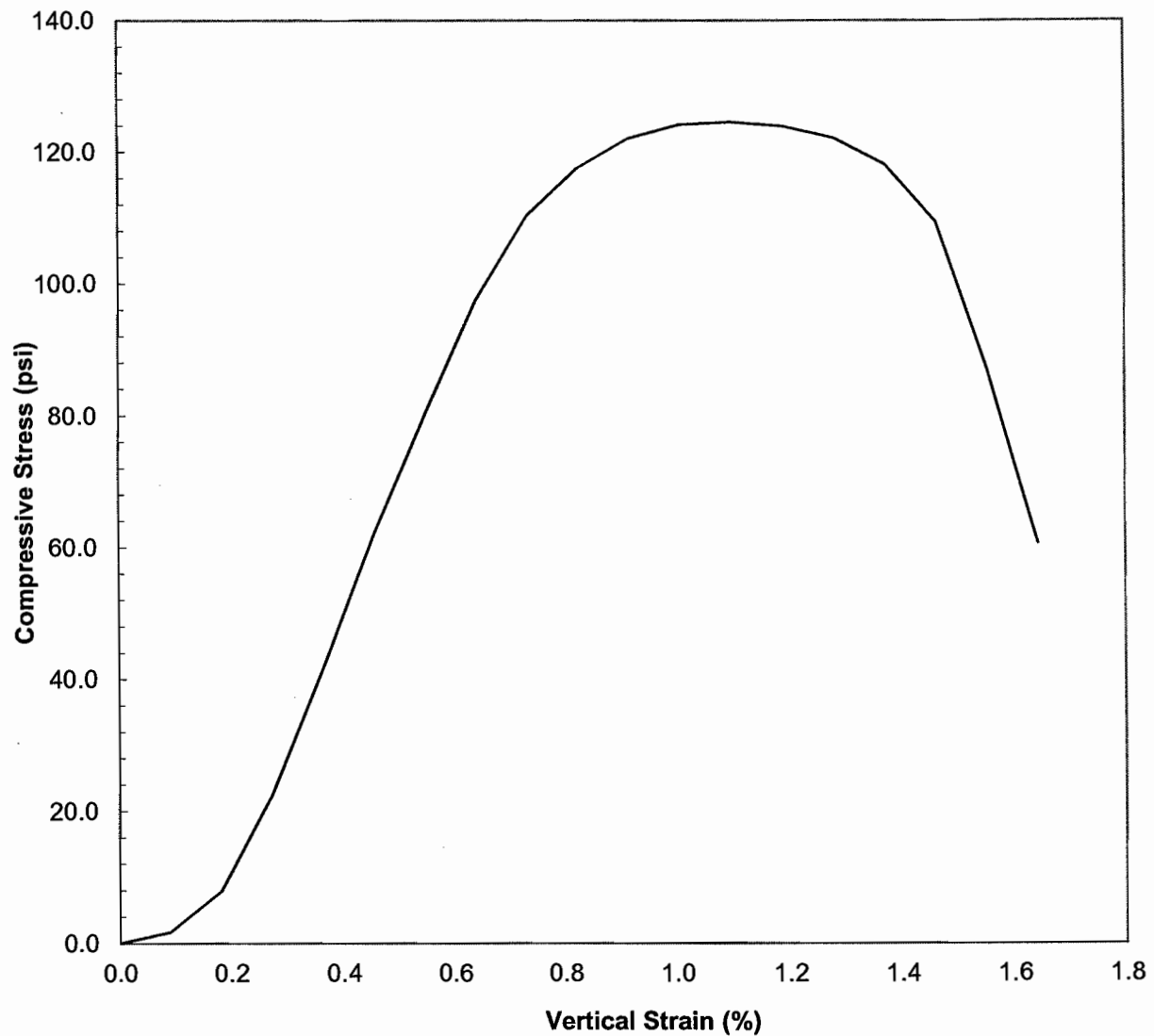
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 7-21, 7 day**

**Depth: N/A**

**ATL Sample No. AT1573S111**





# ATLANTIC TESTING LABORATORIES

**Albany**  
22 Corporate Drive  
Clifton Park, NY 12065  
518-383-9144 (T)  
518-383-9166 (F)

## TRANSMITTAL

April 21, 2011

AECOM  
40 British American Boulevard  
Latham, New York 12110

Attn: Mr. Scott Serviss

E/Mail: [scott.serviss@aecom.com](mailto:scott.serviss@aecom.com)

Re: Soil Laboratory Testing  
NGP Site  
Norwich, New York  
ATL Project No.: AT1573

Dear Mr. Serviss:

Enclosed are the following reports:

AT1573SL-118-4-11	Unconfined Compressive Strength	April 13, 2011
AT1573SL-119-4-11	Unconfined Compressive Strength	April 13, 2011
AT1573SL-86A-2-11	Hydraulic Conductivity	March 24, 2011
AT1573SL-87A-3-11	Hydraulic Conductivity	March 24, 2011
AT1573SL-88A-3-11	Hydraulic Conductivity	March 30, 2011
AT1573SL-91A-2-11	Hydraulic Conductivity	March 24, 2011
AT1573SL-92A-3-11	Hydraulic Conductivity	March 30, 2011
AT1573SL-93A-3-11	Hydraulic Conductivity	March 30, 2011

Please contact our office should you have any questions or if we may be of further service.

Sincerely,  
ATLANTIC TESTING LABORATORIES, Limited

Robert E. Field  
Laboratory Manager  
[bfield@atlantictesting.com](mailto:bfield@atlantictesting.com)

REF/nd

Enclosures



# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

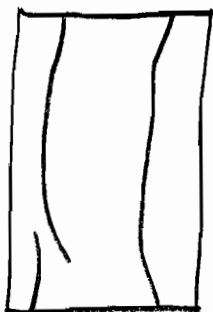
ATL Report No. AT1573SL-118-4-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 6-19

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	4/5/2011
Date of Test	4/19/2011
Age of Sample at Test Date	14 Days
Initial Dry Density (pcf)	80.4
Initial Water Content (%)	38.6
Unconfined Compressive Strength (psi)	283.1
Average Height (in.)	5.591
Average Diameter (in.)	3.009
Height-to-Diameter Ratio	1.86
Average Rate of Strain (%/min)	0.66
Strain at Failure (%)	1.5
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 4/21/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-118-4-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

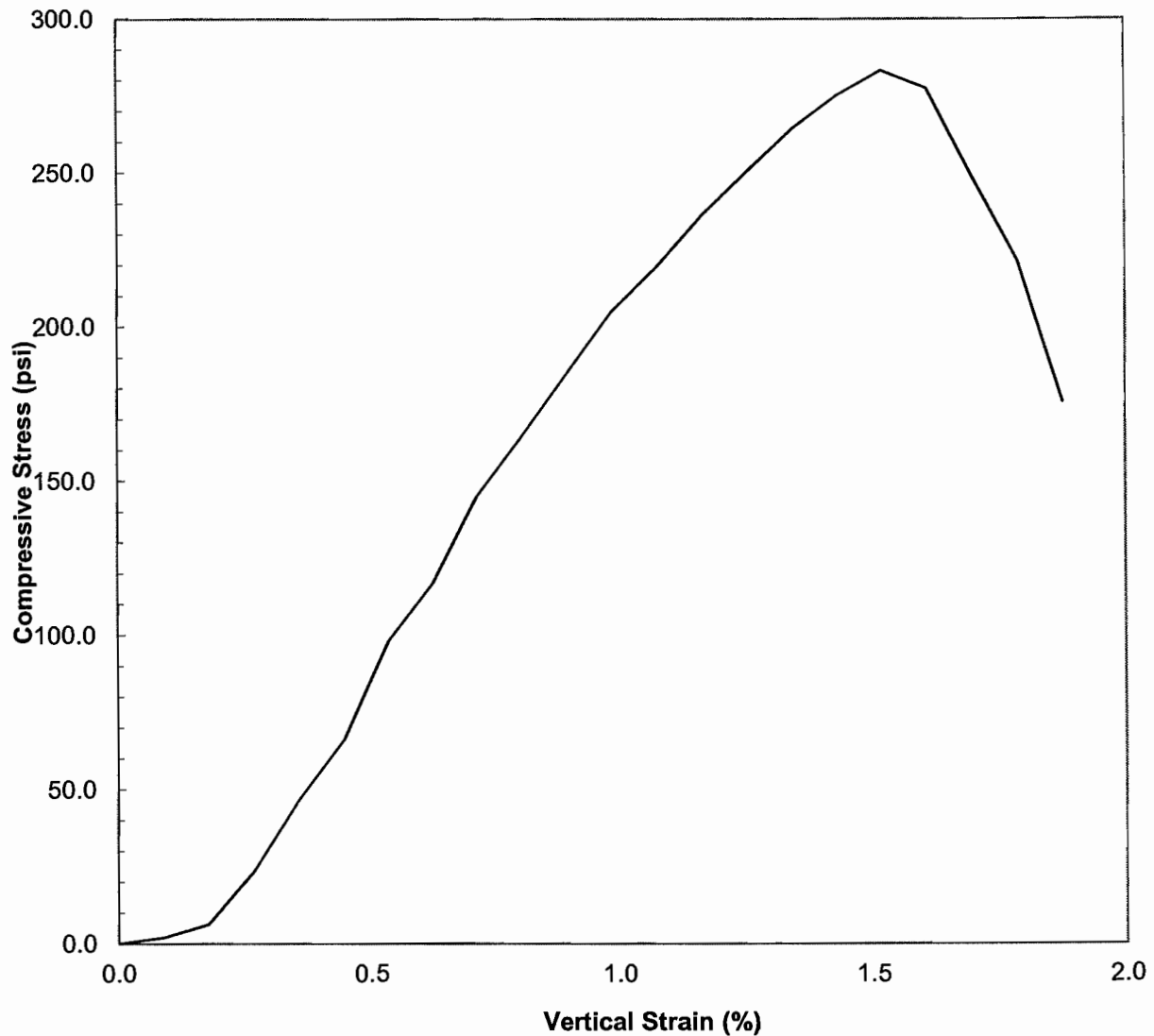
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 6-19, 14 day**

**Depth: N/A**

**ATL Sample No. AT1573S118**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166


ATL Report No. AT1573SL-119-4-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 6-17

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	4/6/2011
Date of Test	4/19/2011
Age of Sample at Test Date	13 Days
Initial Dry Density (pcf)	78.9
Initial Water Content (%)	40.1
Unconfined Compressive Strength (psi)	186.1
Average Height (in.)	5.551
Average Diameter (in.)	3.008
Height-to-Diameter Ratio	1.85
Average Rate of Strain (%/min)	0.67
Strain at Failure (%)	1.2
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 4/21/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-119-4-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

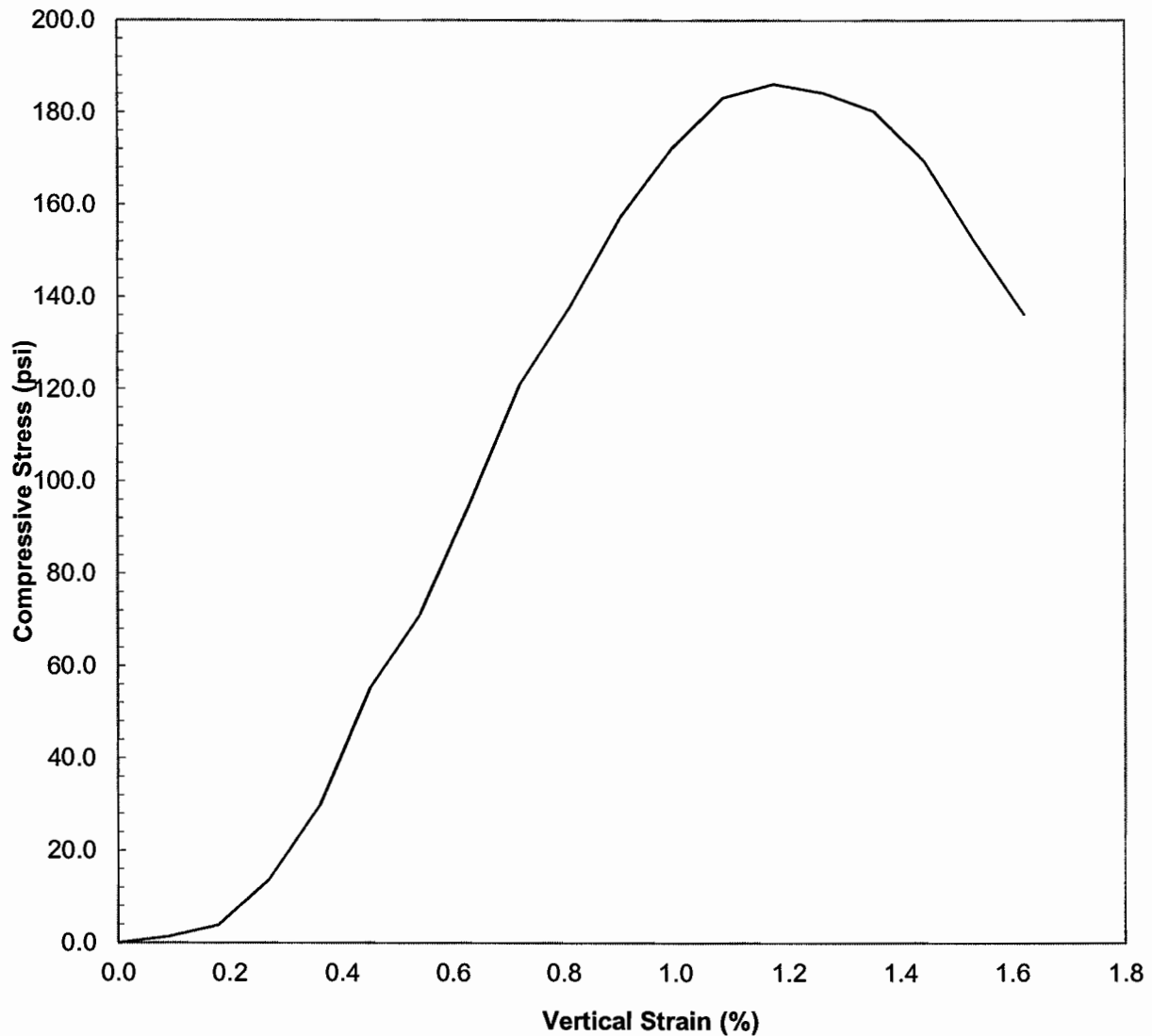
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 6-17, 13 day**

**Depth: N/A**

**ATL Sample No. AT1573S119**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166


ATL Report No. AT1573SL-01B-12-10

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 14-26, 14 days

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	12/02/10
Date of Test	12/16/10
Age of Sample at Test Date	14 days
Initial Dry Density (pcf)	74.3
Initial Water Content (%)	52.0
Unconfined Compressive Strength (psi)	235.8
Average Height (in.)	5.112
Average Diameter (in.)	3.00
Height-to-Diameter Ratio	1.70
Average Rate of Strain (%/min)	0.59
Strain at Failure (%)	1.8
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 12/19/10



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-01B-12-10**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

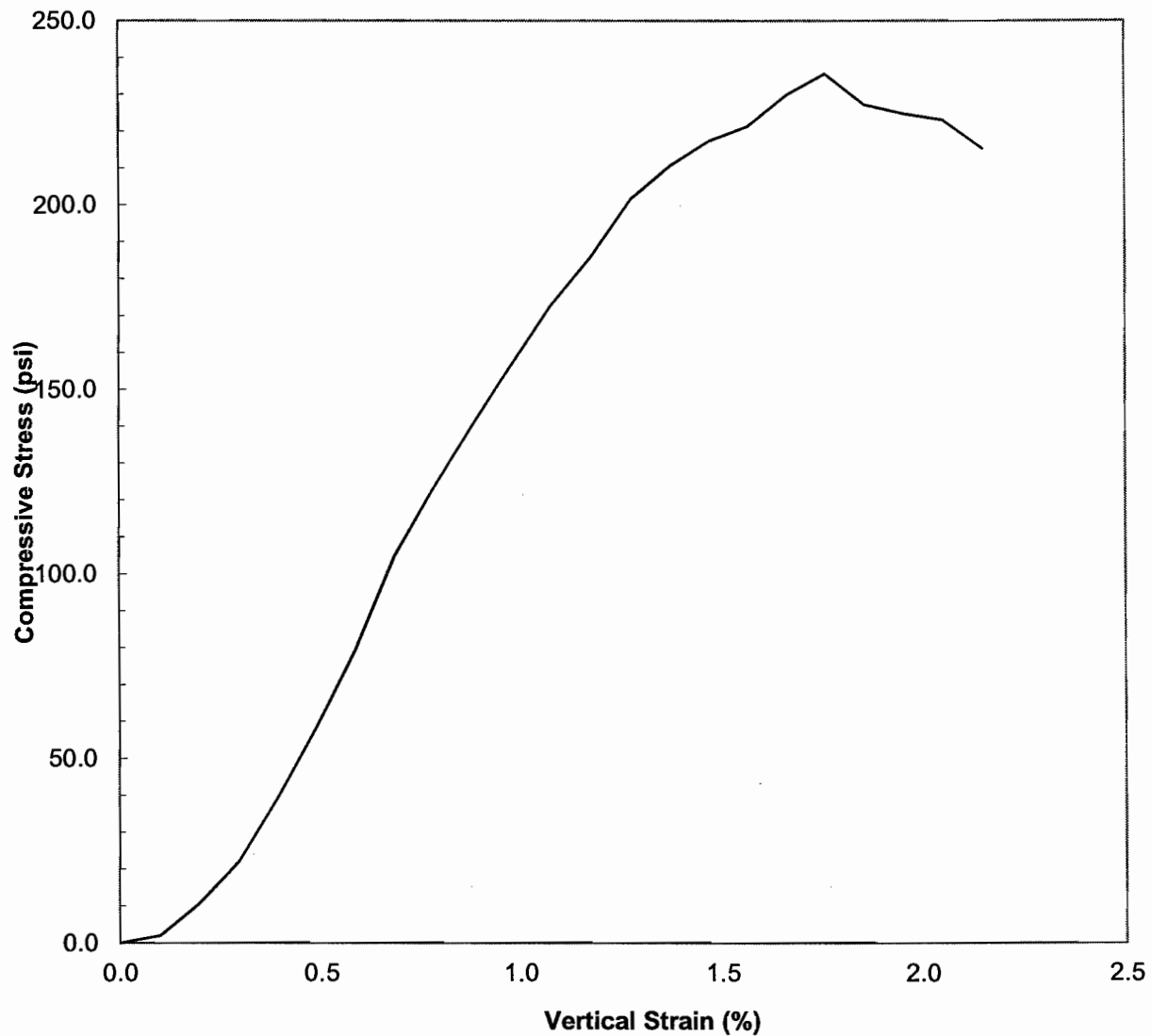
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 14-26, 14 days**

**Depth: N/A**

**ATL Sample No. AT1573S01**







# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

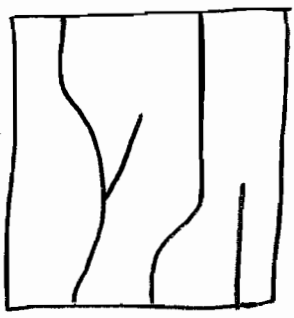
ATL Report No. AT1573SL-02B-12-10

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 14-27, 14 days

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	12/02/2010
Date of Test	12/16/2010
Age of Sample at Test Date	14 days
Initial Dry Density (pcf)	66.6
Initial Water Content (%)	54.9
Unconfined Compressive Strength (psi)	190.7
Average Height (in.)	5.302
Average Diameter (in.)	3.003
Height-to-Diameter Ratio	1.77
Average Rate of Strain (%/min)	0.68
Strain at Failure (%)	2.4
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 12/19/10



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-02B-12-10**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

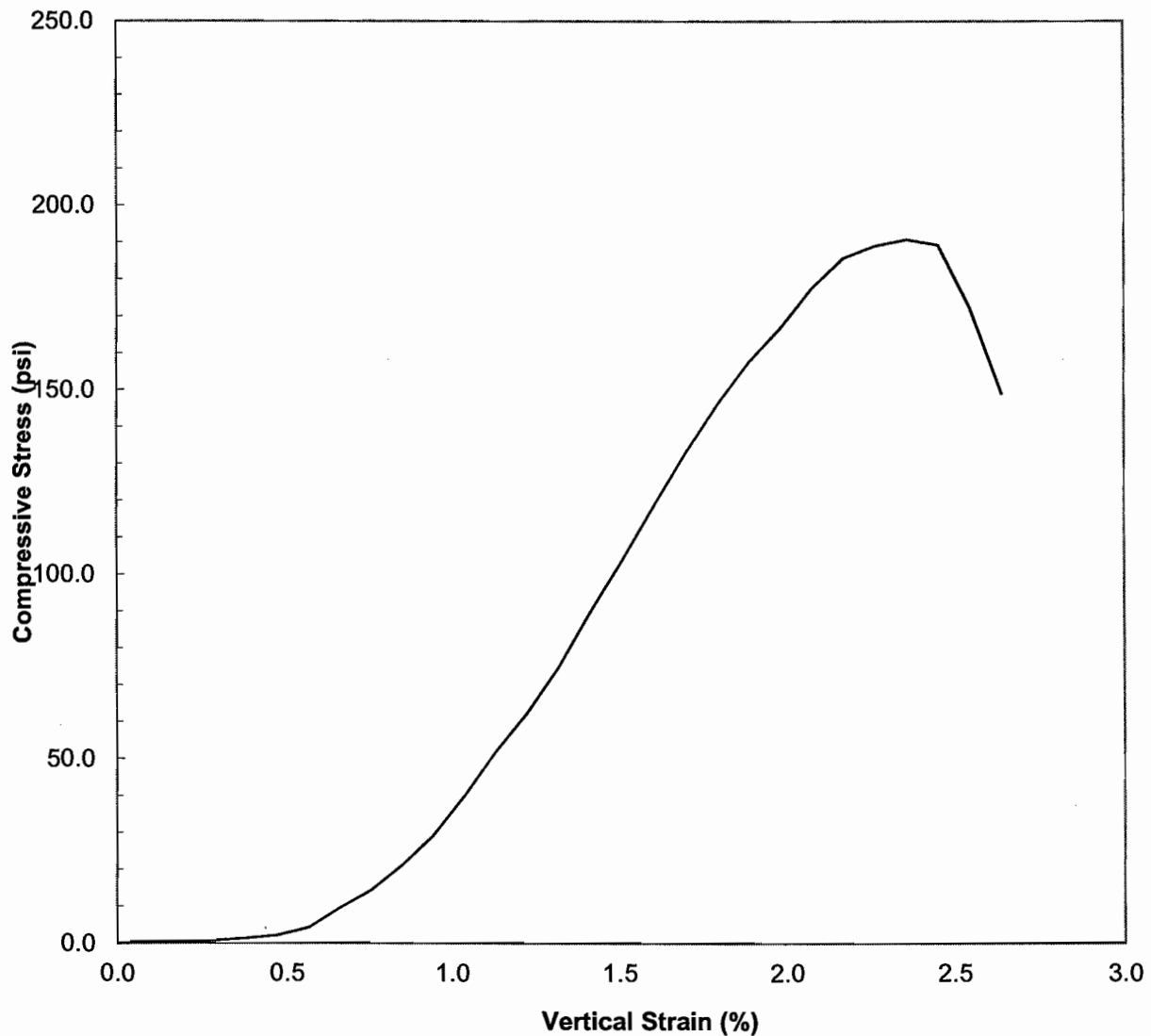
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 14-27, 14 days**

**Depth: N/A**

**ATL Sample No. AT1573S02**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

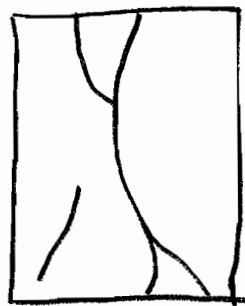
ATL Report No. AT1573SL-03B-12-10

Client: \_\_\_\_\_ AECOM

Project: \_\_\_\_\_ NGP Site, Norwich, New York

Sample ID.: \_\_\_\_\_ 14-28, 14 days

Sample Description: \_\_\_\_\_ Grout Column

Parameter	Results
Date Sample Cast	12/03/2010
Date of Test	12/17/2010
Age of Sample at Test Date	14 days
Initial Dry Density (pcf)	68.9
Initial Water Content (%)	50.2
Unconfined Compressive Strength (psi)	162.1
Average Height (in.)	5.354
Average Diameter (in.)	2.999
Height-to-Diameter Ratio	1.79
Average Rate of Strain (%/min)	0.56
Strain at Failure (%)	1.8
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: \_\_\_\_\_ 

Date: 12/19/10



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-03B-12-10**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

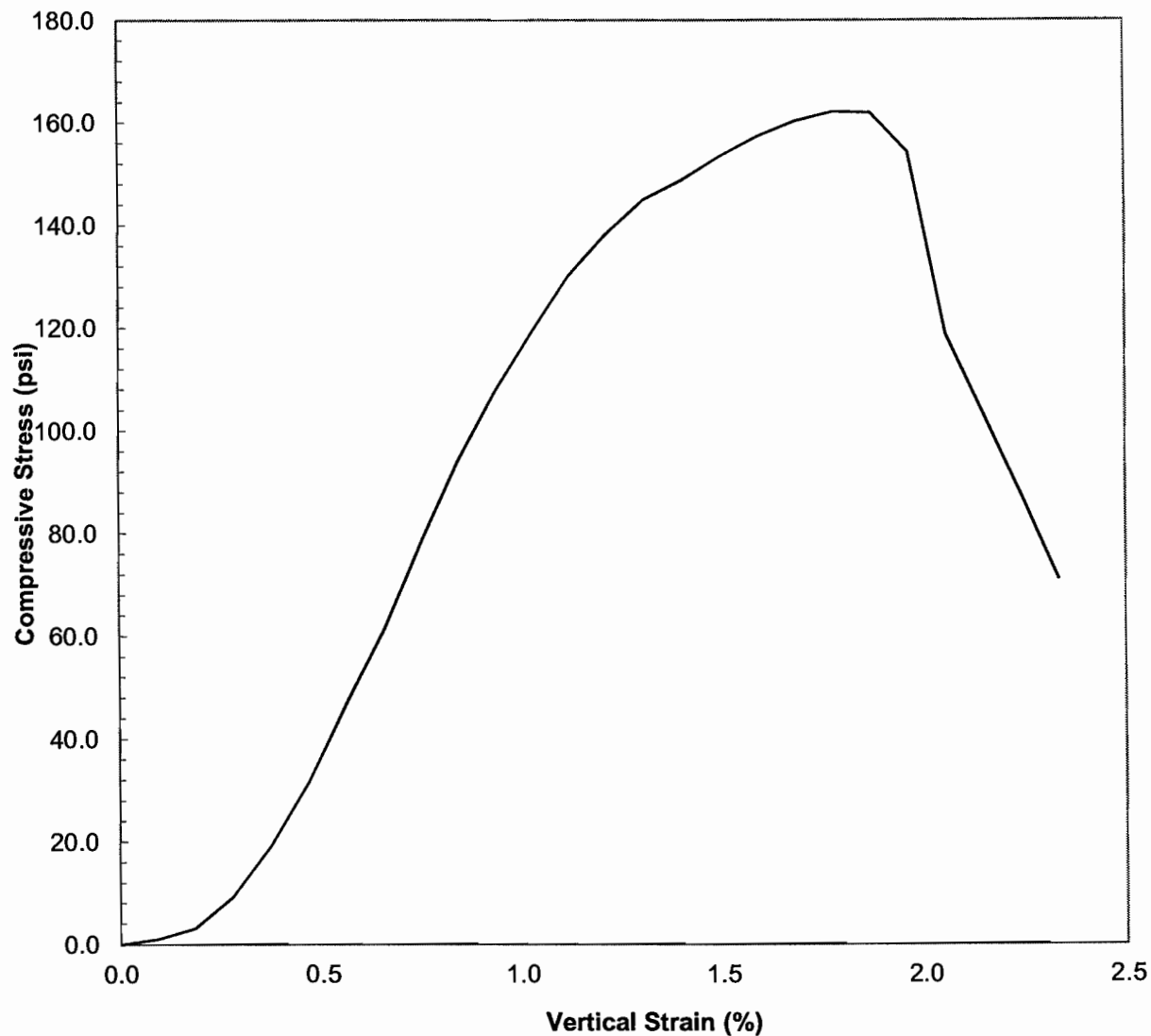
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 14-28 14 days**

**Depth: N/A**

**ATL Sample No. AT1573S03**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

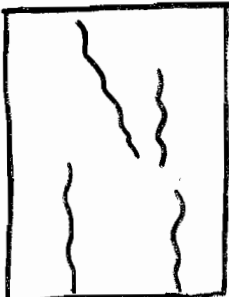
ATL Report No. AT1573SL-04A-12-10

Client: \_\_\_\_\_ AECOM

Project: \_\_\_\_\_ NGP Site, Norwich, New York

Sample ID.: \_\_\_\_\_ 13-30

Sample Description: \_\_\_\_\_ Grout Column

Parameter	Results
Date Sample Cast	12/04/2010
Date of Test	12/18/2010
Age of Sample at Test Date	14 days
Initial Dry Density (pcf)	69.2
Initial Water Content (%)	51.1
Unconfined Compressive Strength (psi)	134.7
Average Height (in.)	5.591
Average Diameter (in.)	3.003
Height-to-Diameter Ratio	1.86
Average Rate of Strain (%/min)	0.75
Strain at Failure (%)	1.7
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by:  \_\_\_\_\_

Date: 12/19/10



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-04A-12-10**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

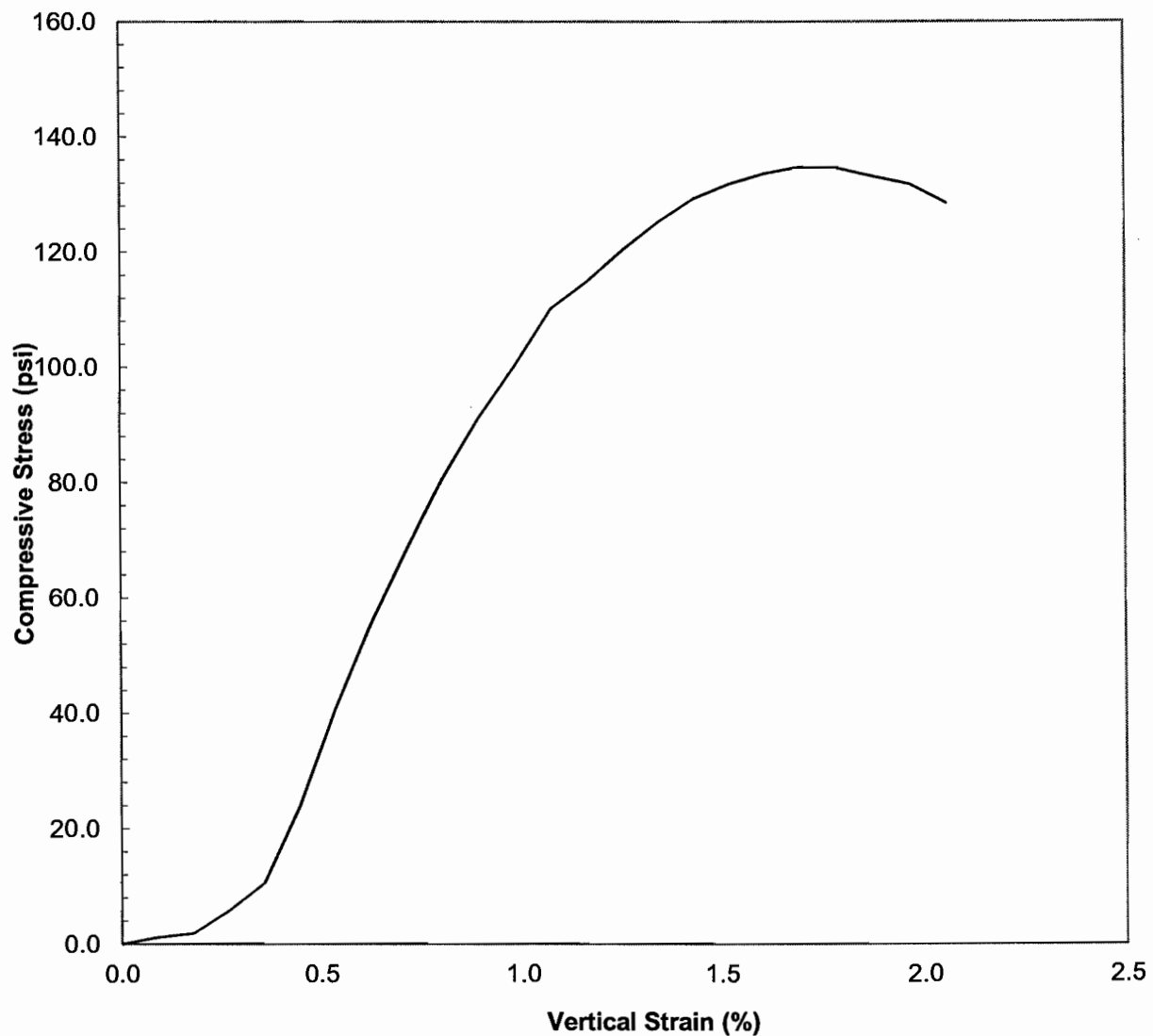
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 13-30, 14 day**

**Depth: N/A**

**ATL Sample No. AT1573S04**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

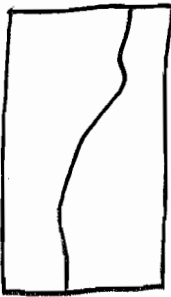
ATL Report No. AT1573SL-05A-12-10

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 12-30

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	12/6/10
Date of Test	12/20/10
Age of Sample at Test Date	14 days
Initial Dry Density (pcf)	66.7
Initial Water Content (%)	53.6
Unconfined Compressive Strength (psi)	91.4
Average Height (in.)	5.591
Average Diameter (in.)	3.007
Height-to-Diameter Ratio	1.86
Average Rate of Strain (%/min)	0.72
Strain at Failure (%)	1.8
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 12/21/10



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-05A-12-10**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

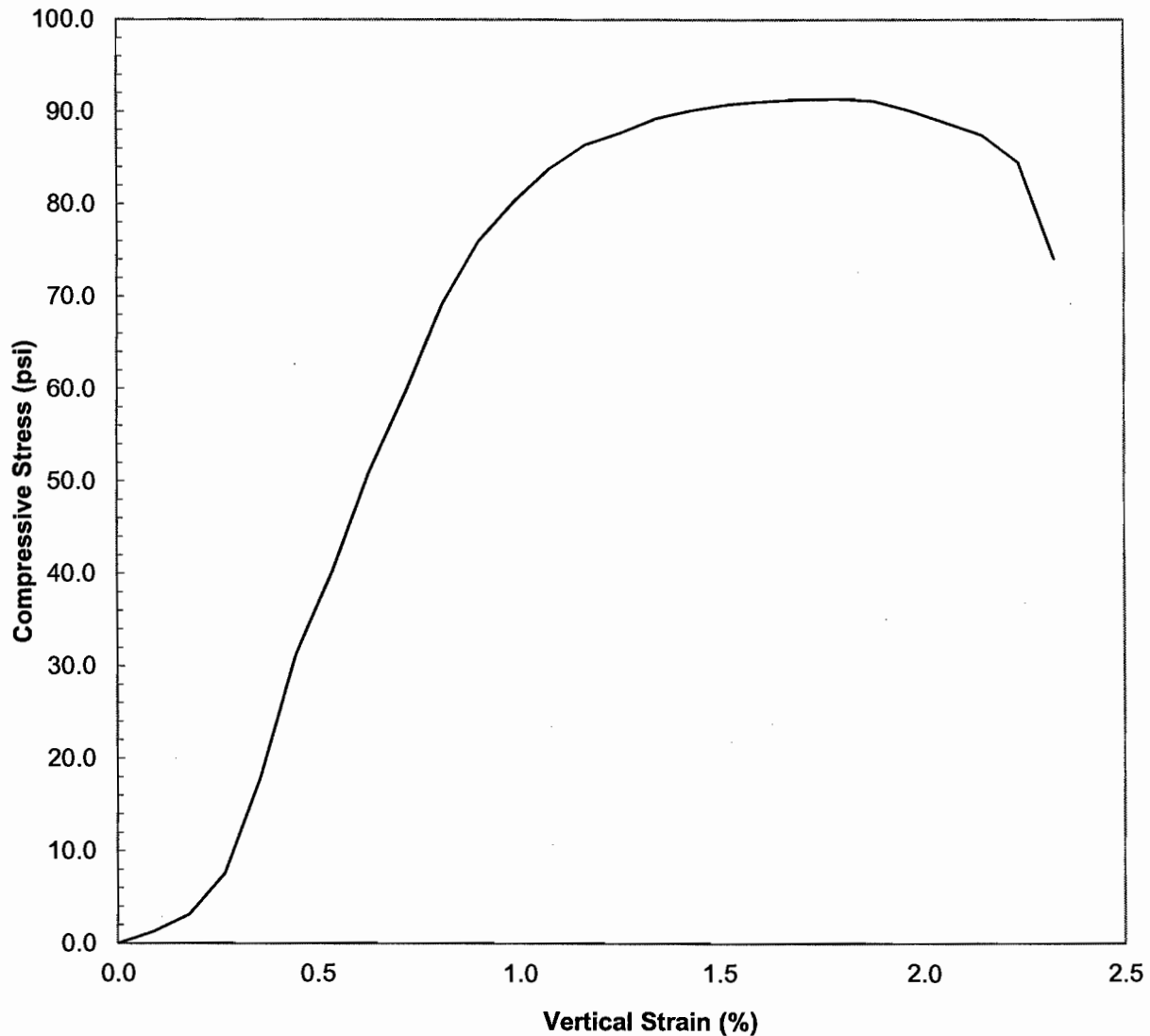
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 12-30, 14 days**

**Depth: N/A**

**ATL Sample No. AT1573S05**







# ATLANTIC TESTING LABORATORIES

**Albany**  
22 Corporate Drive  
Clifton Park, NY 12065  
518-383-9144 (T)  
518-383-9166 (F)

## TRANSMITTAL

December 26, 2010

AECOM  
40 British American Boulevard  
Latham, New York 12110

Attn: Mr. Scott Serviss

E/Mail: scott.serviss@aecom.com

Re: Soil Laboratory Testing  
NGP Site  
Norwich, New York  
ATL Project No.: AT1573

Dear Mr. Serviss:

Enclosed are the following reports:

AT1573SL-06A-12-10	Unconfined Compressive Strength	December 07, 2010
AT1573SL-07B-12-10	Unconfined Compressive Strength	December 08, 2010
AT1573SL-08A-12-10	Unconfined Compressive Strength	December 08, 2010
AT1573SL-09B-12-10	Unconfined Compressive Strength	December 09, 2010
AT1573SL-10A-12-10	Unconfined Compressive Strength	December 09, 2010
AT1573SL-11B-12-10	Unconfined Compressive Strength	December 09, 2010
AT1573SL-12B-12-10	Unconfined Compressive Strength	December 09, 2010
AT1573SL-17-12-10	Unconfined Compressive Strength	December 14, 2010
AT1573SL-18-12-10	Unconfined Compressive Strength	December 15, 2010
AT1573SL-19-12-10	Unconfined Compressive Strength	December 16, 2010

Please contact our office should you have any questions or if we may be of further service.

Sincerely,

ATLANTIC TESTING LABORATORIES, Limited

Robert E. Field  
Laboratory Manager  
bfield@atlantictesting.com

REF/nd

Enclosures



# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166


ATL Report No. AT1573SL-06A-12-10

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 11-30

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	12/7/10
Date of Test	12/21/10
Age of Sample at Test Date	14 days
Initial Dry Density (pcf)	70.1
Initial Water Content (%)	48.9
Unconfined Compressive Strength (psi)	146.3
Average Height (in.)	5.591
Average Diameter (in.)	3.004
Height-to-Diameter Ratio	1.86
Average Rate of Strain (%/min)	0.72
Strain at Failure (%)	1.8
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 12/26/10



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-06A-12-10**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

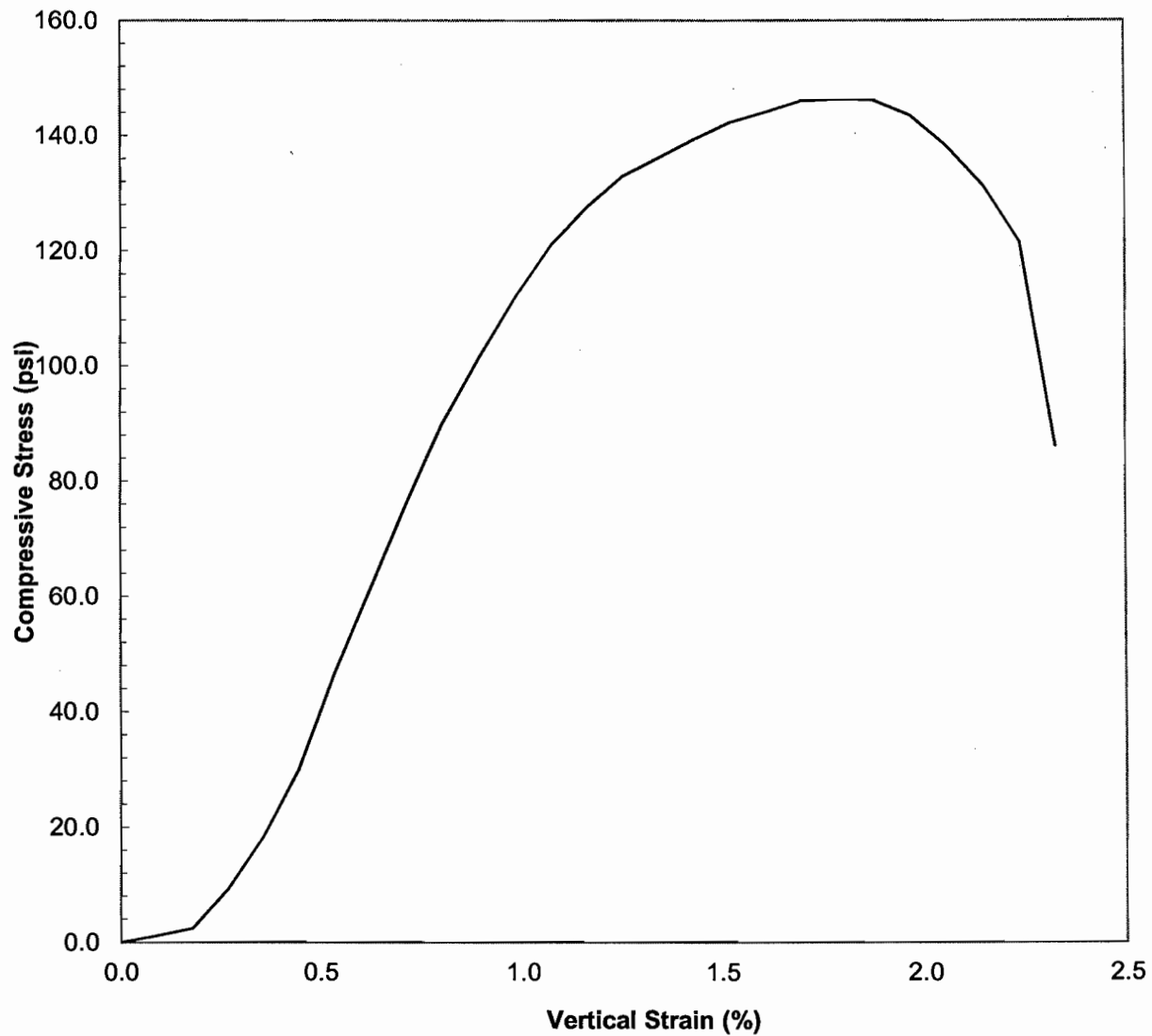
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 11-30, 14 day**

**Depth: N/A**

**ATL Sample No. AT1573S06**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166


ATL Report No. AT1573SL-07B-12-10

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: T6-20

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	12/8/10
Date of Test	12/22/10
Age of Sample at Test Date	14 days
Initial Dry Density (pcf)	81.7
Initial Water Content (%)	39.2
Unconfined Compressive Strength (psi)	194.7
Average Height (in.)	5.630
Average Diameter (in.)	2.980
Height-to-Diameter Ratio	1.89
Average Rate of Strain (%/min)	0.52
Strain at Failure (%)	1.9
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 12/20/10



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-07B-12-10**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

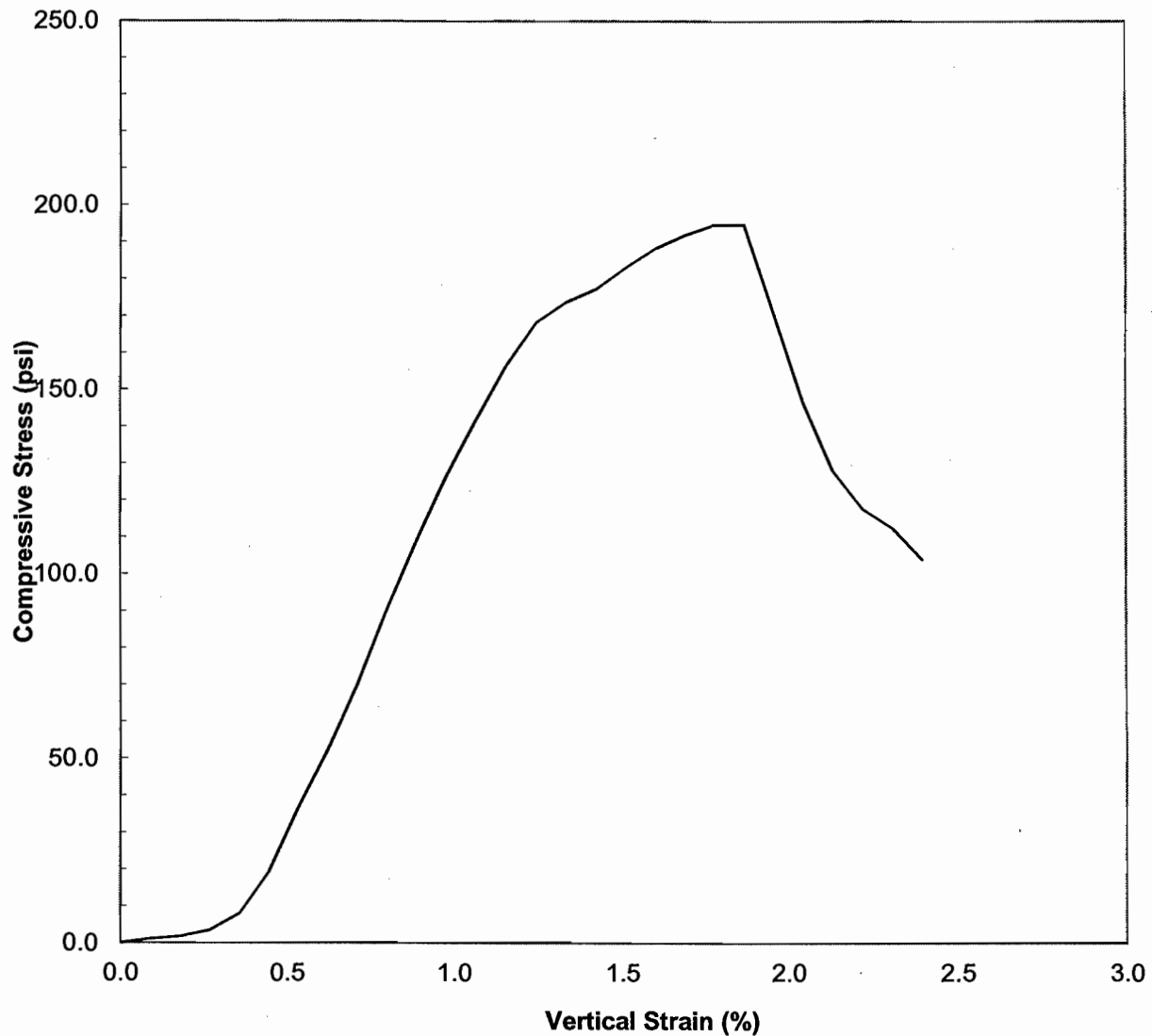
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: T6-20, 14 days**

**Depth: N/A**

**ATL Sample No. AT1573S07**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

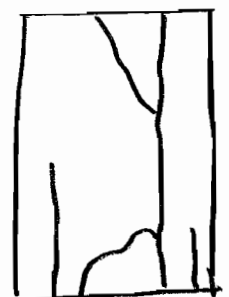
ATL Report No. AT1573SL-08A-12-10

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 6-29

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	12/8/10
Date of Test	12/22/10
Age of Sample at Test Date	14 days
Initial Dry Density (pcf)	70.0
Initial Water Content (%)	50.9
Unconfined Compressive Strength (psi)	196.6
Average Height (in.)	5.591
Average Diameter (in.)	2.996
Height-to-Diameter Ratio	1.87
Average Rate of Strain (%/min)	0.57
Strain at Failure (%)	2.1
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 12/26/10



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-08A-12-10**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

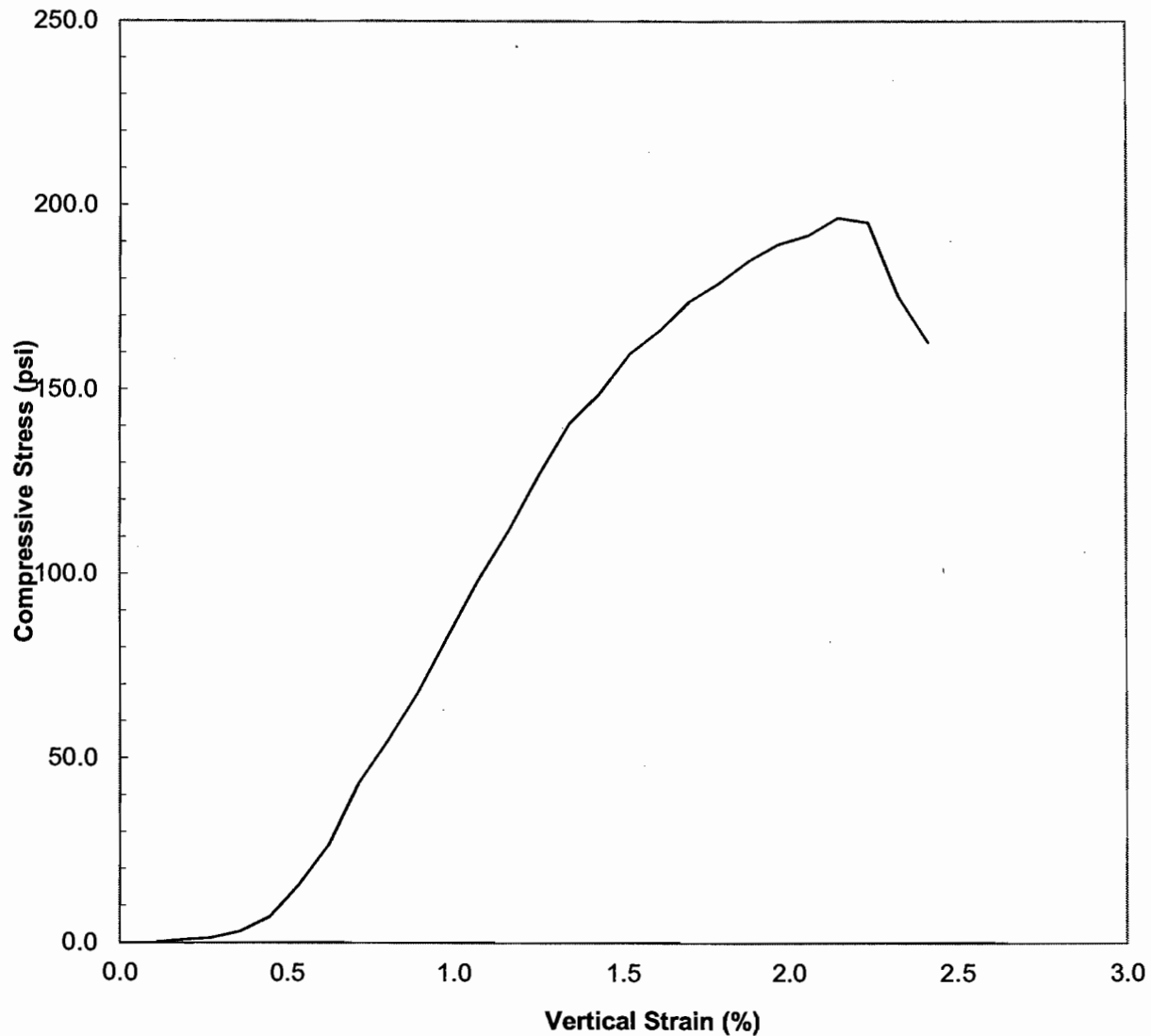
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 6-29, 14 days**

**Depth: N/A**

**ATL Sample No. AT1573S08**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

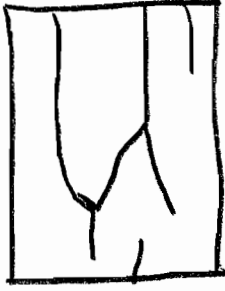
ATL Report No. AT1573SL-09B-12-10

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: T4-12

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	12/09/2010
Date of Test	12/23/2010
Age of Sample at Test Date	14 days
Initial Dry Density (pcf)	84.6
Initial Water Content (%)	35.7
Unconfined Compressive Strength (psi)	316.4
Average Height (in.)	5.591
Average Diameter (in.)	3.000
Height-to-Diameter Ratio	1.86
Average Rate of Strain (%/min)	0.68
Strain at Failure (%)	2.0
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 12/26/10





# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-09B-12-10**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

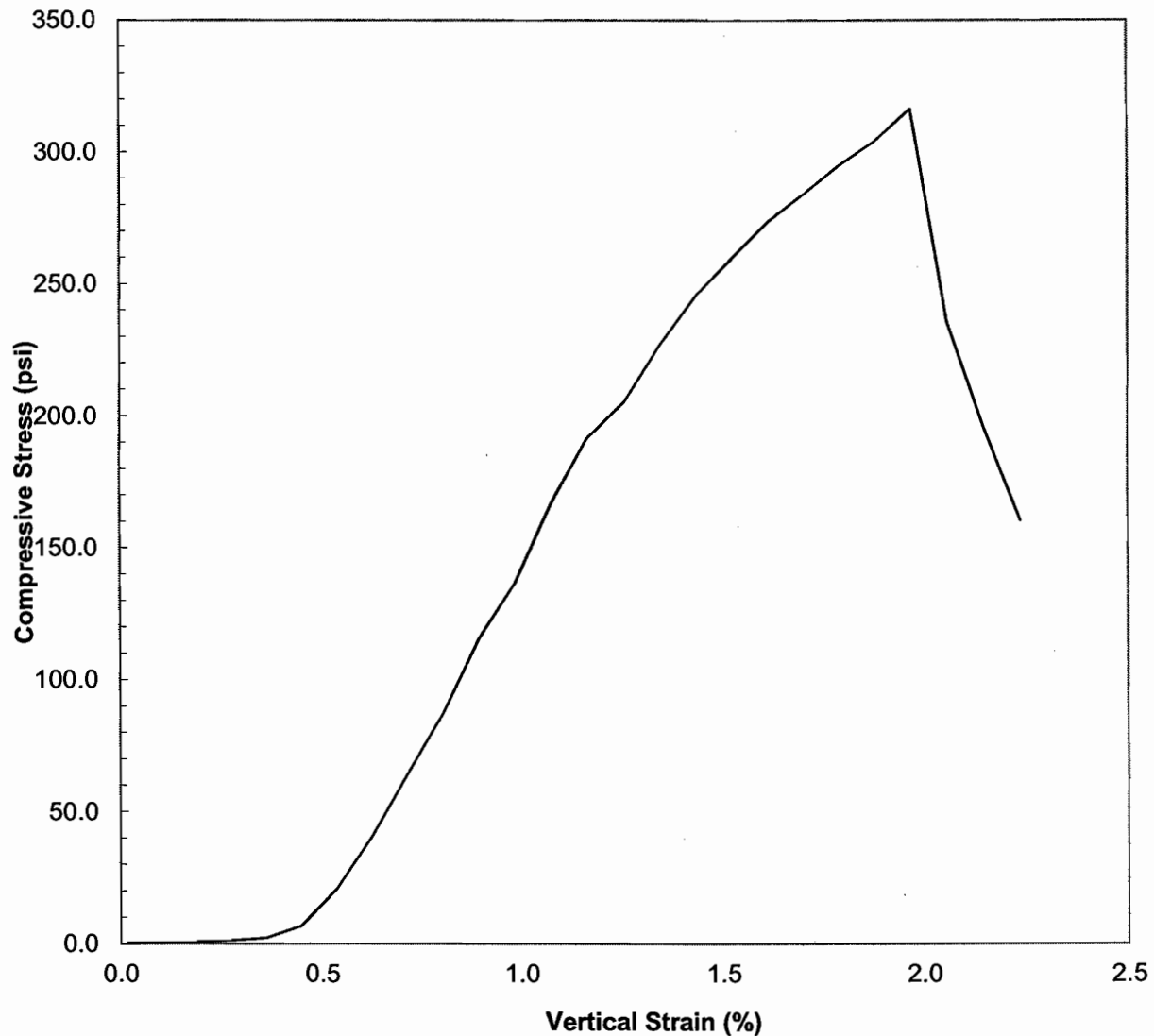
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: T4-12, 14 day**

**Depth: N/A**

**ATL Sample No. AT1573S09**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

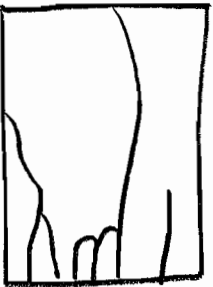
ATL Report No. AT1573SL-10A-12-10

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 5-30

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	12/09/2010
Date of Test	12/23/2010
Age of Sample at Test Date	14 days
Initial Dry Density (pcf)	74.1
Initial Water Content (%)	46.6
Unconfined Compressive Strength (psi)	93.6
Average Height (in.)	5.276
Average Diameter (in.)	2.998
Height-to-Diameter Ratio	1.77
Average Rate of Strain (%/min)	0.68
Strain at Failure (%)	2.0
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 12/26/10



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-10A-12-10**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

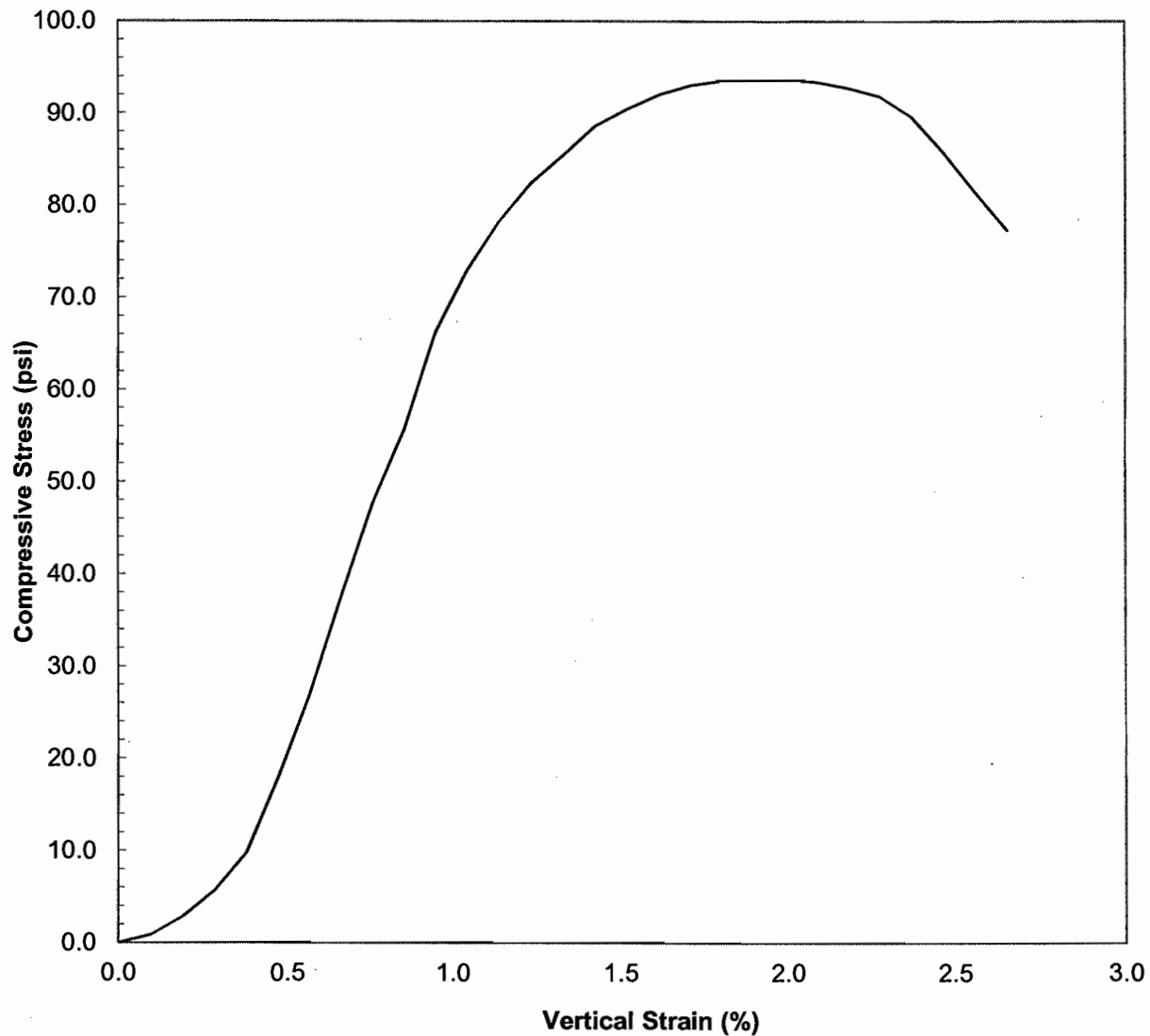
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 5-30, 14 day**

**Depth: N/A**

**ATL Sample No. AT1573S010**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

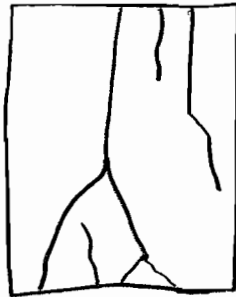
ATL Report No. AT1573SL-11B-12-10

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: T4-9

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	12/09/2010
Date of Test	12/23/2010
Age of Sample at Test Date	14 days
Initial Dry Density (pcf)	86.2
Initial Water Content (%)	33.8
Unconfined Compressive Strength (psi)	258.8
Average Height (in.)	5.617
Average Diameter (in.)	2.999
Height-to-Diameter Ratio	1.87
Average Rate of Strain (%/min)	0.68
Strain at Failure (%)	1.8
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 12/26/10



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-11B-12-10**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

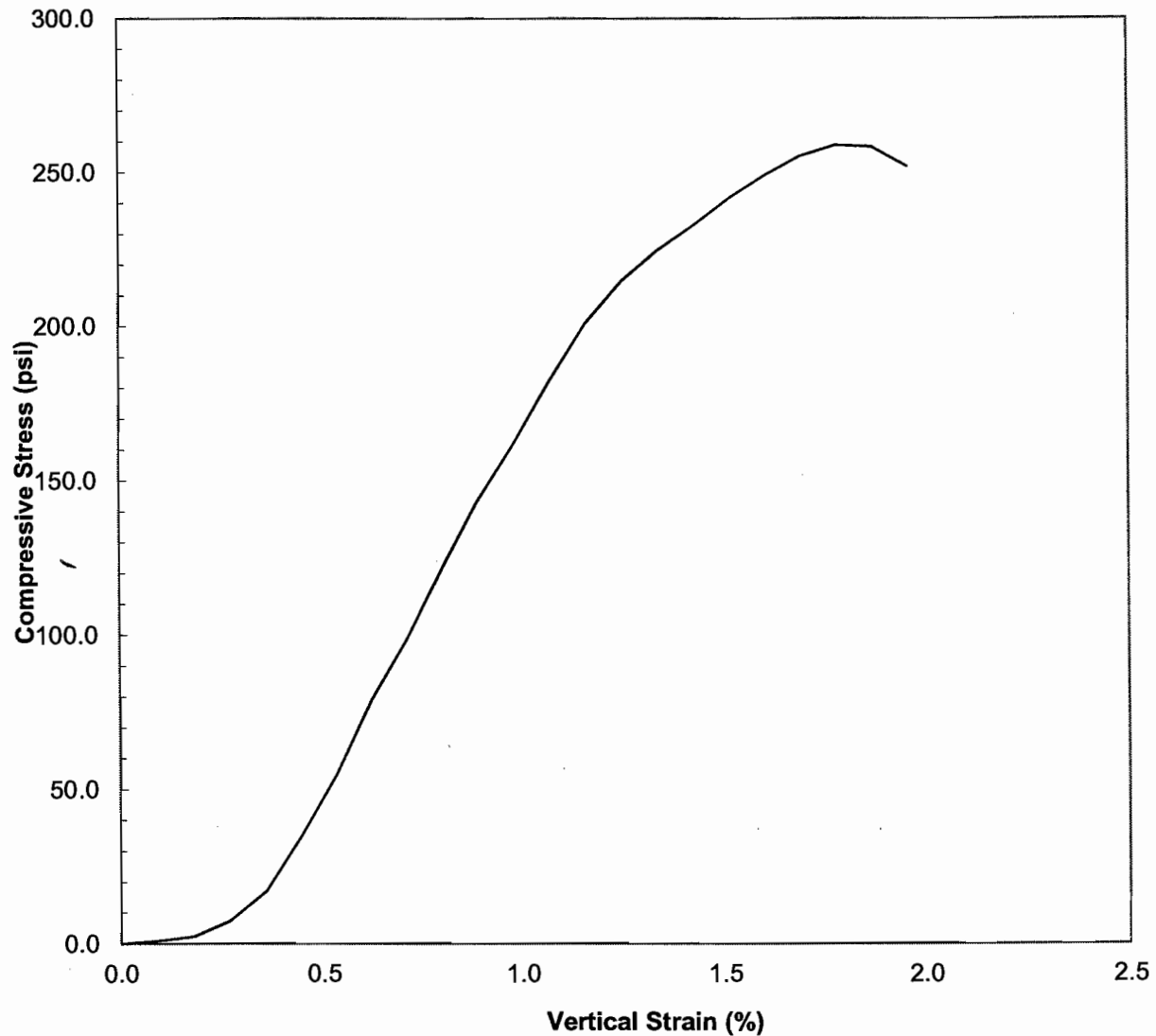
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: T4-9, 14 day**

**Depth: N/A**

**ATL Sample No. AT1573S011**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166


ATL Report No. AT1573SL-12B-12-10

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: T6-16

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	12/09/2010
Date of Test	12/23/2010
Age of Sample at Test Date	14 days
Initial Dry Density (pcf)	87.8
Initial Water Content (%)	32.5
Unconfined Compressive Strength (psi)	338.8
Average Height (in.)	5.564
Average Diameter (in.)	2.997
Height-to-Diameter Ratio	1.86
Average Rate of Strain (%/min)	0.68
Strain at Failure (%)	1.9
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 12/26/10



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-12B-12-10**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

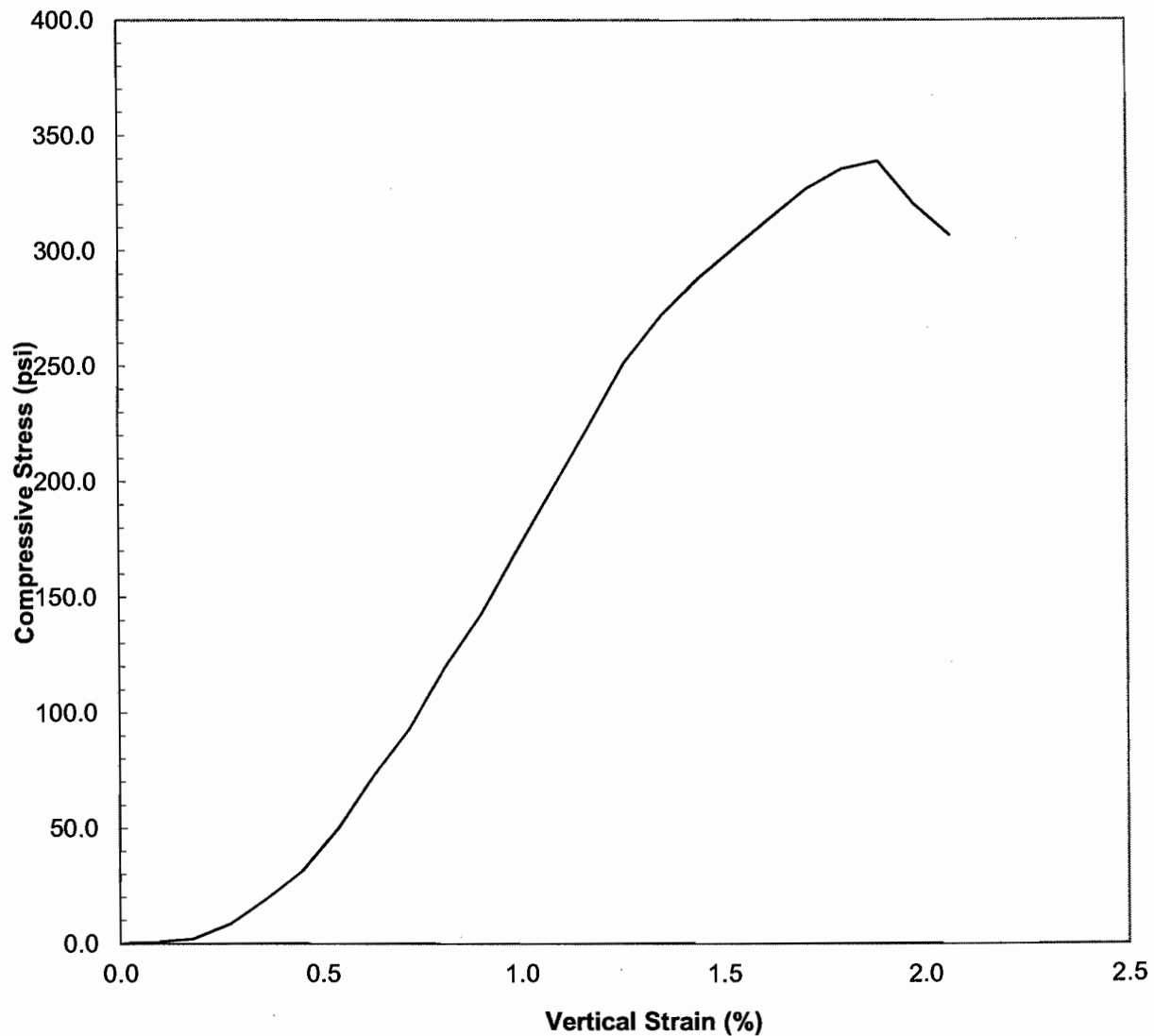
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: T6-16, 14 day**

**Depth: N/A**

**ATL Sample No. AT1573S012**





# ATLANTIC TESTING LABORATORIES

**Albany**  
22 Corporate Drive  
Clifton Park, NY 12065  
518-383-9144 (T)  
518-383-9166 (F)

## TRANSMITTAL

December 28, 2010

AECOM  
40 British American Boulevard  
Latham, New York 12110

Attn: Mr. Scott Serviss

E/Mail: [scott.serviss@aecom.com](mailto:scott.serviss@aecom.com)

Re: Soil Laboratory Testing  
NGP Site  
Norwich, New York  
ATL Project No.: AT1573

Dear Mr. Serviss:

Enclosed are the following reports:

AT1573SL-13A-12-10	Unconfined Compressive Strength	December 10, 2010
AT1573SL-14A-12-10	Unconfined Compressive Strength	December 11, 2010
AT1573SL-15A-12-10	Unconfined Compressive Strength	December 12, 2010
AT1573SL-16A-12-10	Unconfined Compressive Strength	December 13, 2010
AT1573SL-20-12-10	Unconfined Compressive Strength	December 17, 2010
AT1573SL-21-12-10	Unconfined Compressive Strength	December 18, 2010

Please contact our office should you have any questions or if we may be of further service.

Sincerely,  
ATLANTIC TESTING LABORATORIES, Limited

Robert E. Field  
Laboratory Manager  
[bfield@atlantictesting.com](mailto:bfield@atlantictesting.com)

REF/nd

Enclosures





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

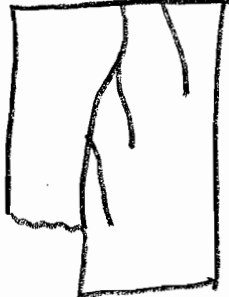
ATL Report No. AT1573SL-13A-12-10

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 4-20

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	12/10/2010
Date of Test	12/27/2010
Age of Sample at Test Date	17 days
Initial Dry Density (pcf)	67.8
Initial Water Content (%)	54.7
Unconfined Compressive Strength (psi)	127.6
Average Height (in.)	5.315
Average Diameter (in.)	2.996
Height-to-Diameter Ratio	1.77
Average Rate of Strain (%/min)	0.68
Strain at Failure (%)	1.8
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: REF

Date: 12/28/10



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-13A-12-10**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

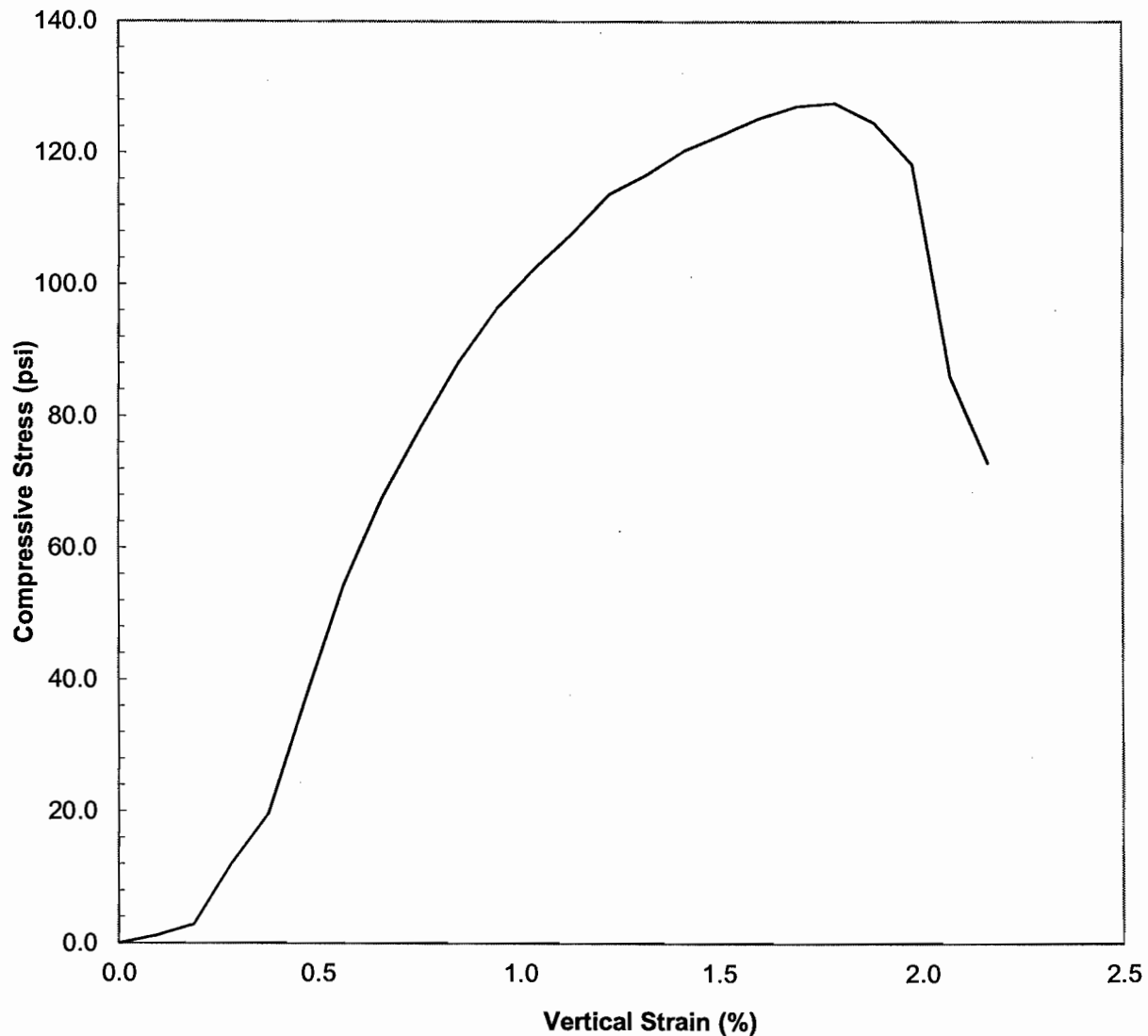
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 4-20, 17 days**

**Depth: N/A**

**ATL Sample No. AT1573S013**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

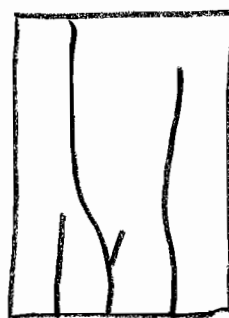
ATL Report No. AT1573SL-14A-12-10

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 5-25

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	12/11/2010
Date of Test	12/27/2010
Age of Sample at Test Date	16 days
Initial Dry Density (pcf)	66.0
Initial Water Content (%)	56.6
Unconfined Compressive Strength (psi)	115.2
Average Height (in.)	5.591
Average Diameter (in.)	2.995
Height-to-Diameter Ratio	1.87
Average Rate of Strain (%/min)	0.68
Strain at Failure (%)	1.4
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 12/28/10



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-14A-12-10**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

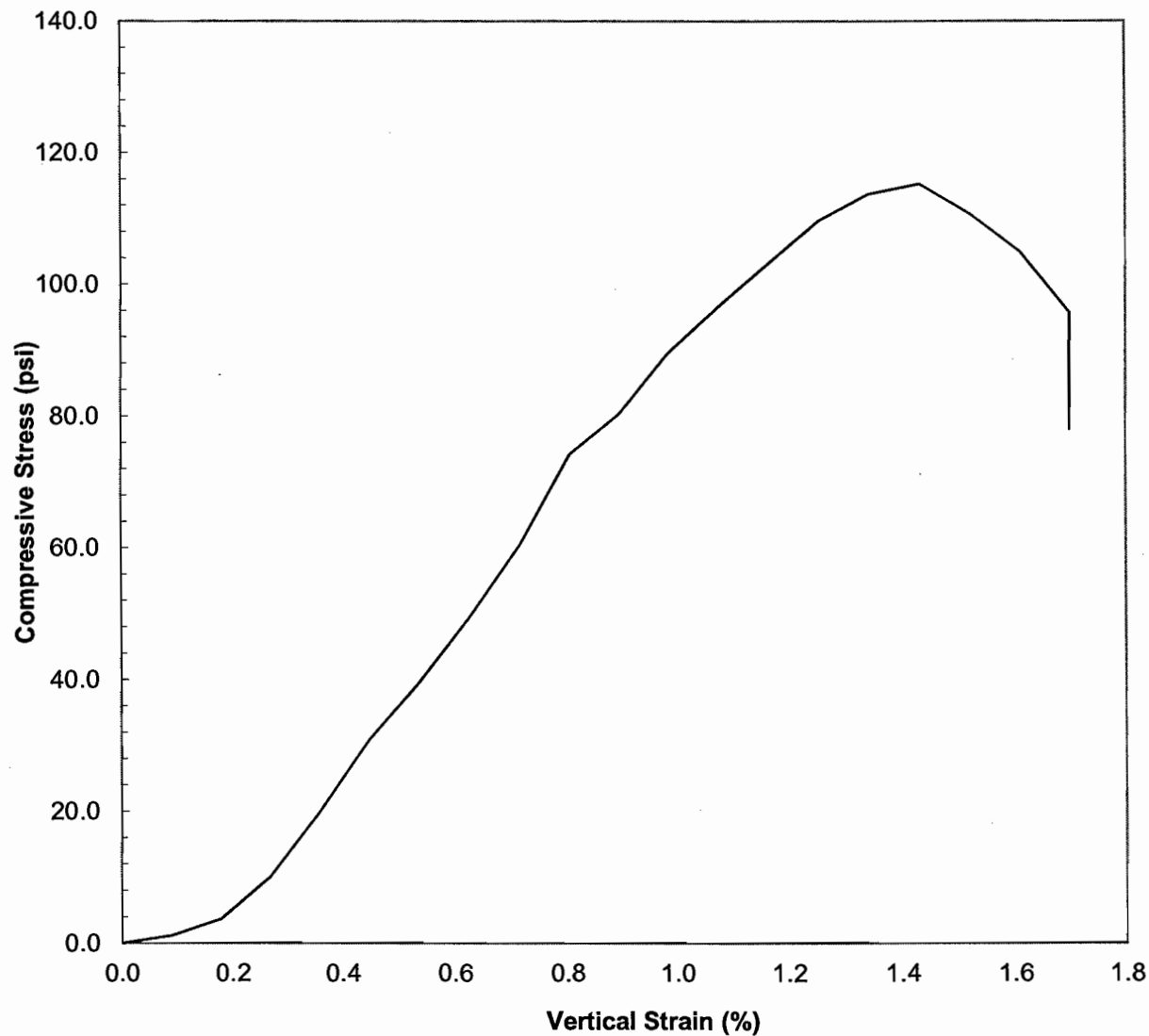
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 5-25, 16 days**

**Depth: N/A**

**ATL Sample No. AT1573S014**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166


ATL Report No. AT1573SL-15A-12-10

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 5-24

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	12/12/2010
Date of Test	12/27/2010
Age of Sample at Test Date	15 days
Initial Dry Density (pcf)	69.2
Initial Water Content (%)	50.9
Unconfined Compressive Strength (psi)	132.4
Average Height (in.)	5.787
Average Diameter (in.)	2.995
Height-to-Diameter Ratio	1.93
Average Rate of Strain (%/min)	0.67
Strain at Failure (%)	2.0
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: REF

Date: 12/28/10



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-15A-12-10**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

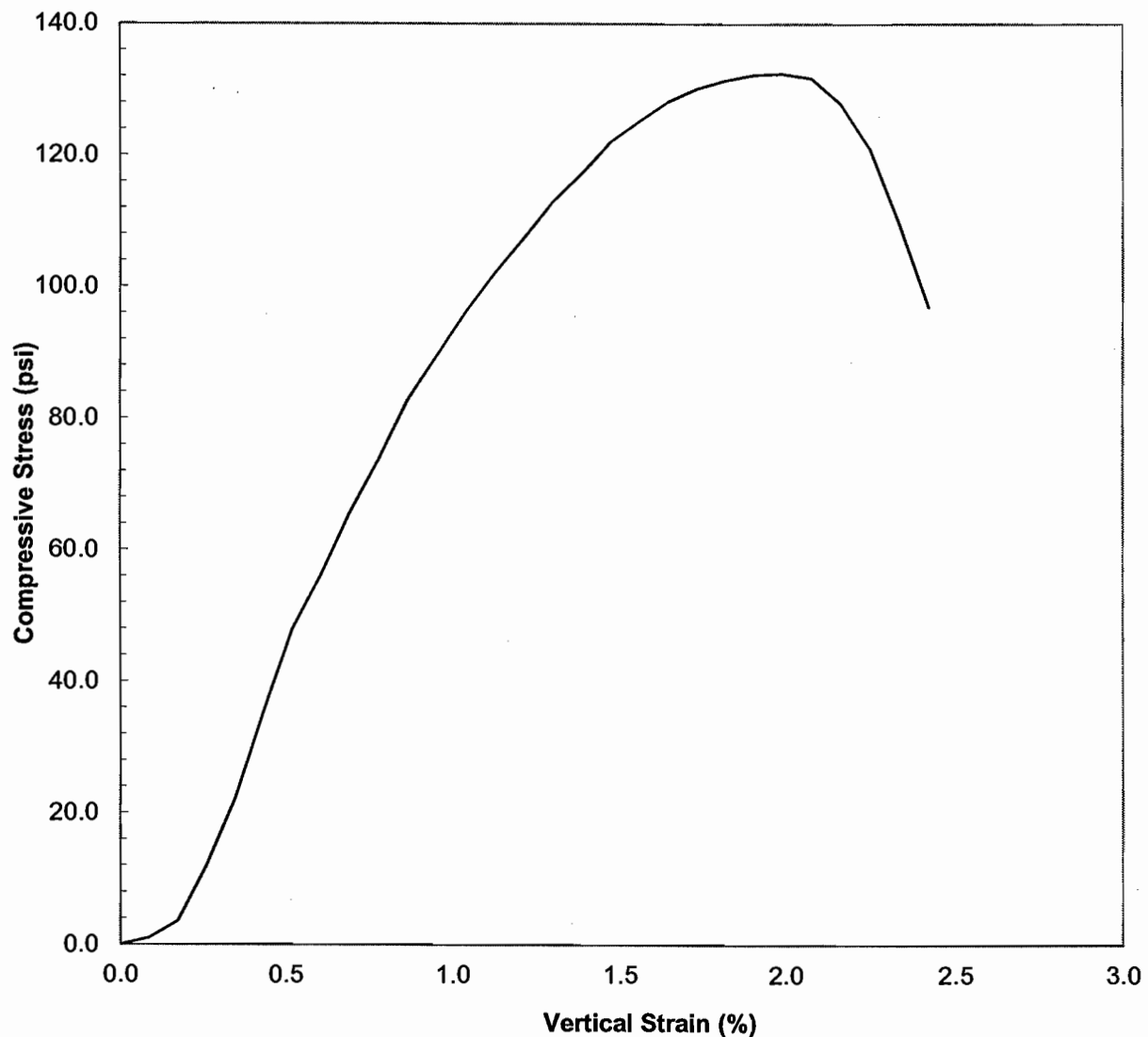
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 5-24, 15 days**

**Depth: N/A**

**ATL Sample No. AT1573S015**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

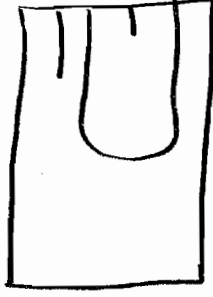
ATL Report No. AT1573SL-16A-12-10

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 15-25

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	12/13/2010
Date of Test	12/27/10
Age of Sample at Test Date	14 days
Initial Dry Density (pcf)	69.6
Initial Water Content (%)	50.7
Unconfined Compressive Strength (psi)	100.1
Average Height (in.)	5.512
Average Diameter (in.)	2.992
Height-to-Diameter Ratio	1.84
Average Rate of Strain (%/min)	0.69
Strain at Failure (%)	1.6
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 12/28/10



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-16A-12-10**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

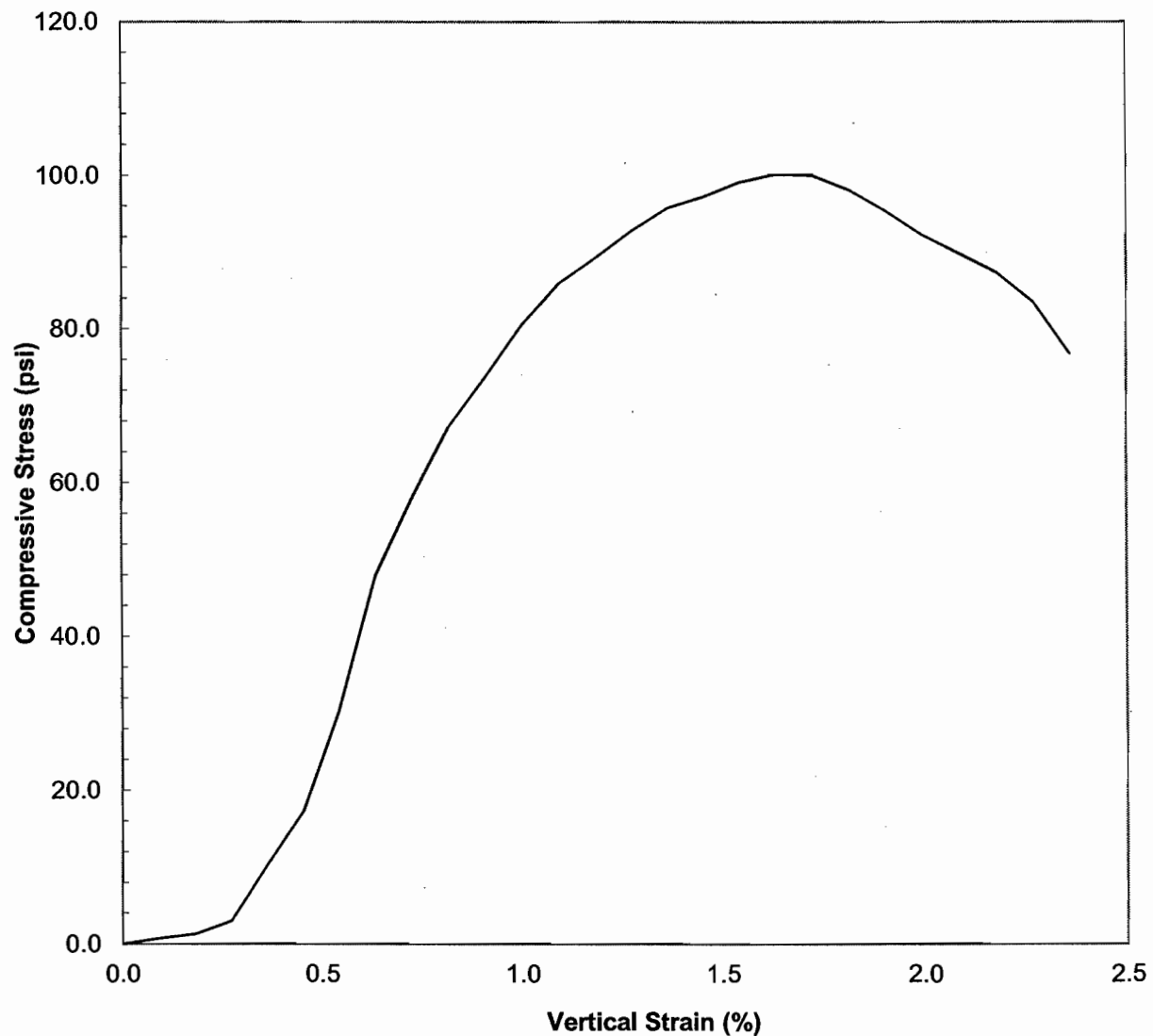
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 15-25, 14 days**

**Depth: N/A**

**ATL Sample No. AT1573S016**







# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166


ATL Report No. AT1573SL-17A-12-10

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 17-24

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	12/14/2010
Date of Test	12/28/2010
Age of Sample at Test Date	14 days
Initial Dry Density (pcf)	72.0
Initial Water Content (%)	46.5
Unconfined Compressive Strength (psi)	74.4
Average Height (in.)	5.512
Average Diameter (in.)	2.993
Height-to-Diameter Ratio	1.84
Average Rate of Strain (%/min)	0.69
Strain at Failure (%)	1.9
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 12/29/10



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-17A-12-10**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

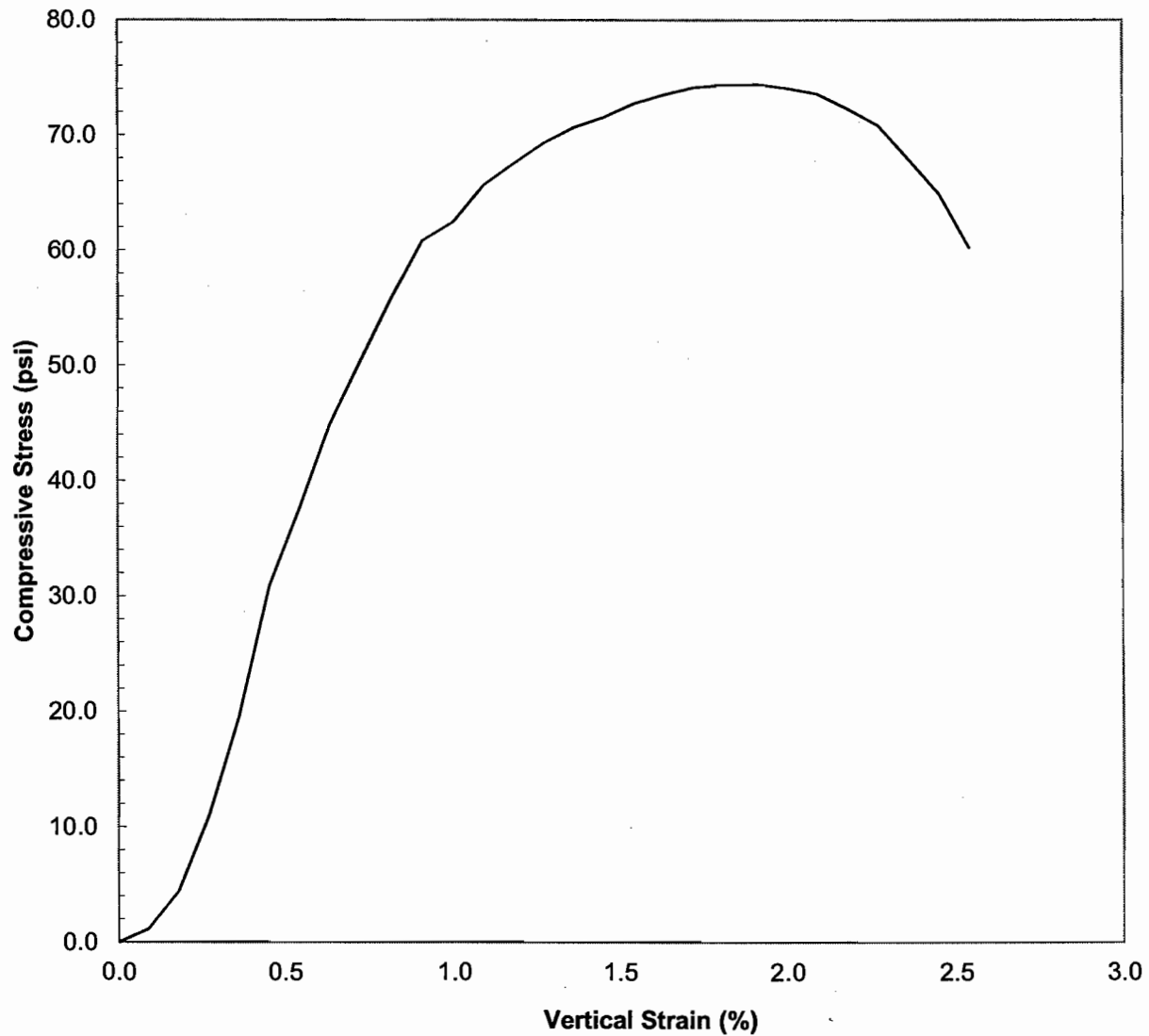
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 17-24, 14 days**

**Depth: N/A**

**ATL Sample No. AT1573S017**





# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-02C-12-10**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

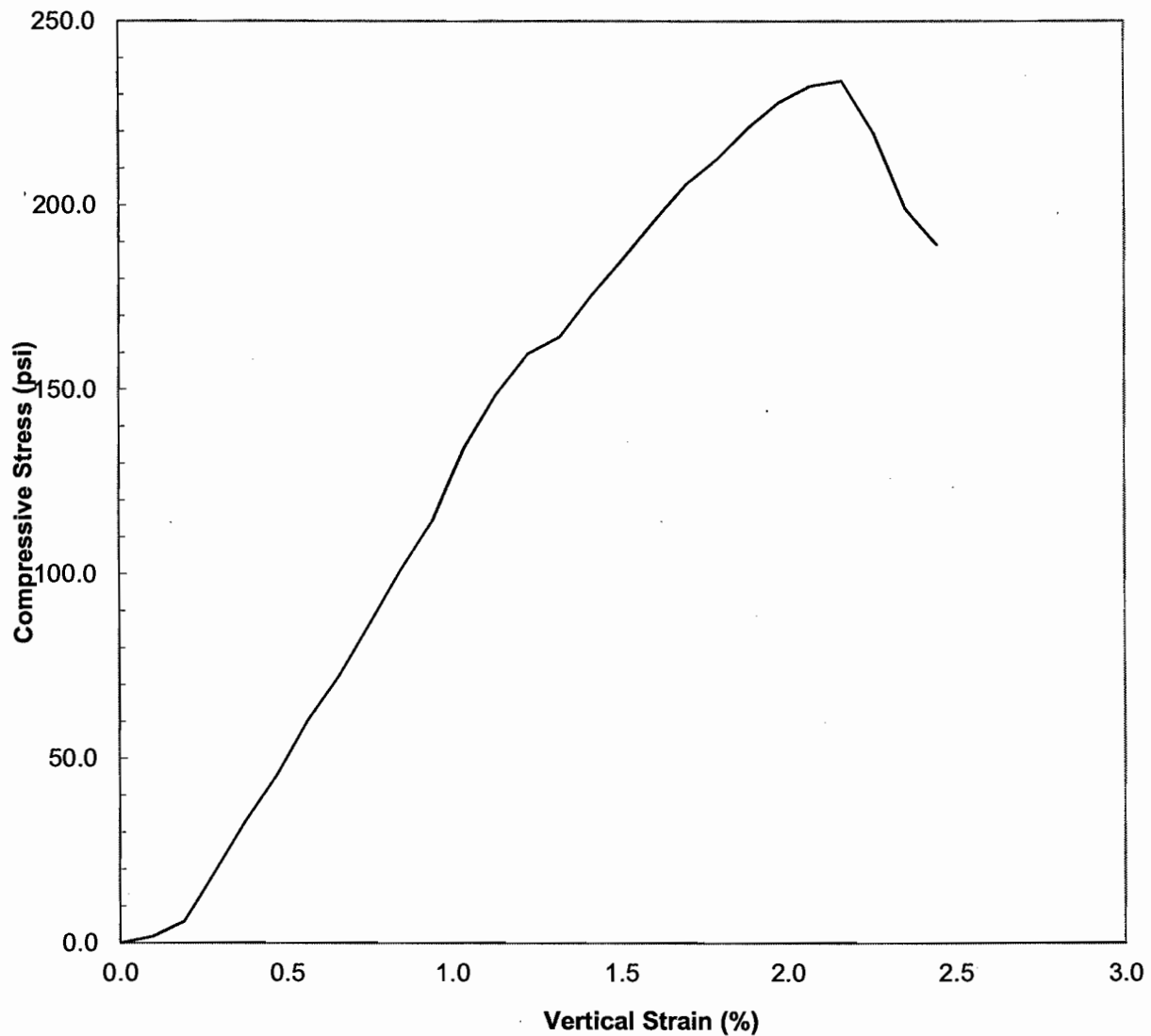
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 14-27, 28 days**

**Depth: N/A**

**ATL Sample No. AT1573S02**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

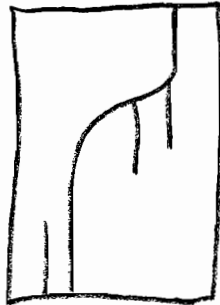
ATL Report No. AT1573SL-18A-12-10

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 17-22

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	12/15/2010
Date of Test	12/29/2010
Age of Sample at Test Date	14 Days
Initial Dry Density (pcf)	64.0
Initial Water Content (%)	58.5
Unconfined Compressive Strength (psi)	166.3
Average Height (in.)	5.669
Average Diameter (in.)	2.996
Height-to-Diameter Ratio	1.89
Average Rate of Strain (%/min)	0.71
Strain at Failure (%)	1.5
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 1/3/11



# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

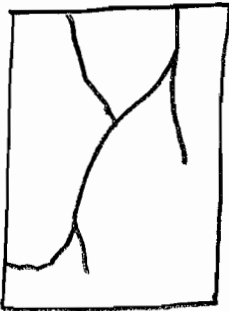
ATL Report No. AT1573SL-19A-12-10

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 21-21

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	12/16/2010
Date of Test	12/30/2010
Age of Sample at Test Date	14 Days
Initial Dry Density (pcf)	69.5
Initial Water Content (%)	51.5
Unconfined Compressive Strength (psi)	103.0
Average Height (in.)	5.394
Average Diameter (in.)	2.988
Height-to-Diameter Ratio	1.81
Average Rate of Strain (%/min)	0.69
Strain at Failure (%)	1.7
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 1/3/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-19A-12-10**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

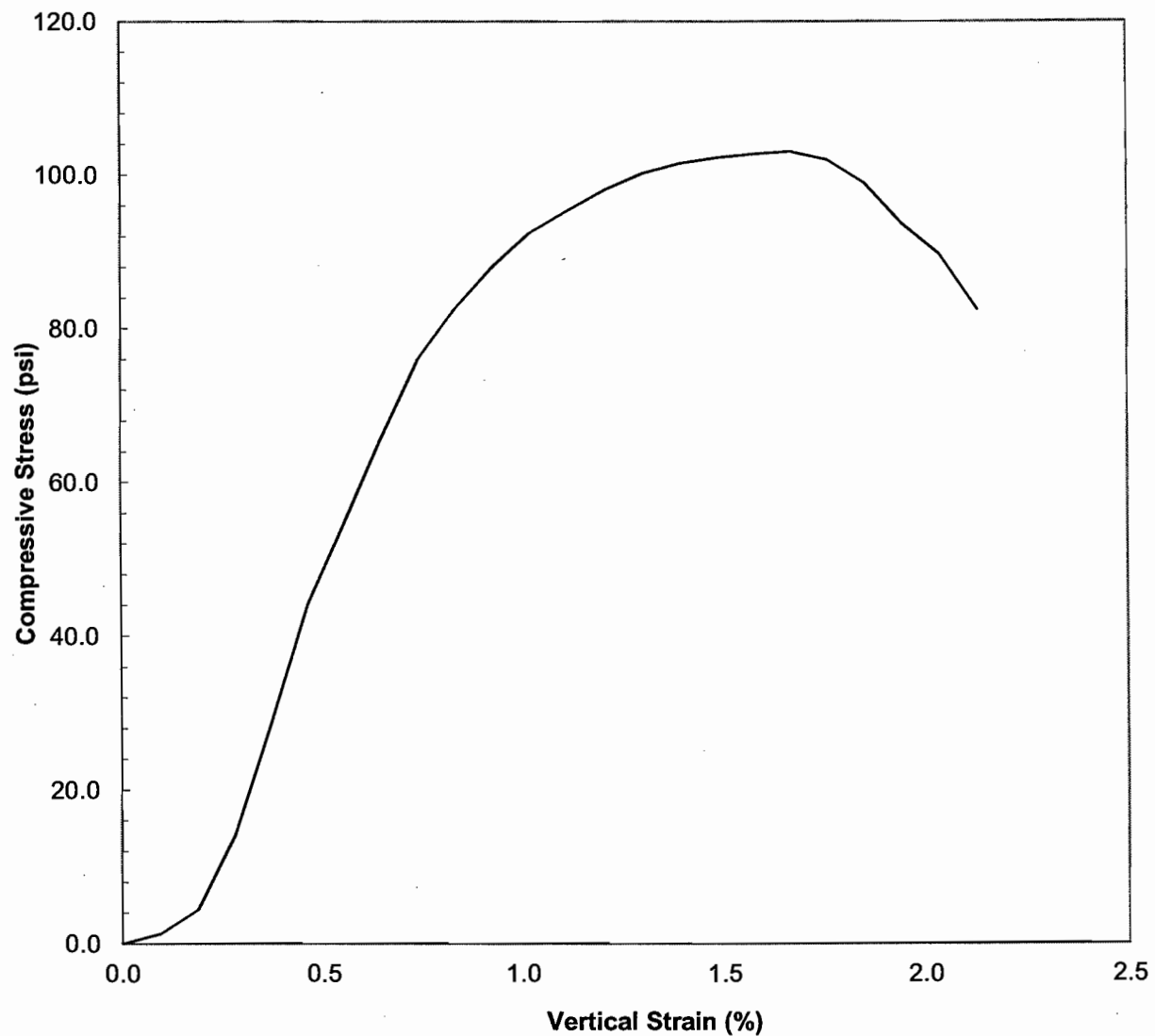
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 21-21, 14 days**

**Depth: N/A**

**ATL Sample No. AT1573S019**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

ATL Report No. AT1573SL-20A-12-10

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 24-19

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	12/17/2010
Date of Test	1/03/2011
Age of Sample at Test Date	17 Days
Initial Dry Density (pcf)	68.7
Initial Water Content (%)	52.1
Unconfined Compressive Strength (psi)	109.7
Average Height (in.)	5.551
Average Diameter (in.)	2.996
Height-to-Diameter Ratio	1.85
Average Rate of Strain (%/min)	0.72
Strain at Failure (%)	1.7
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by:

Date: 1/4/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-20A-12-10**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

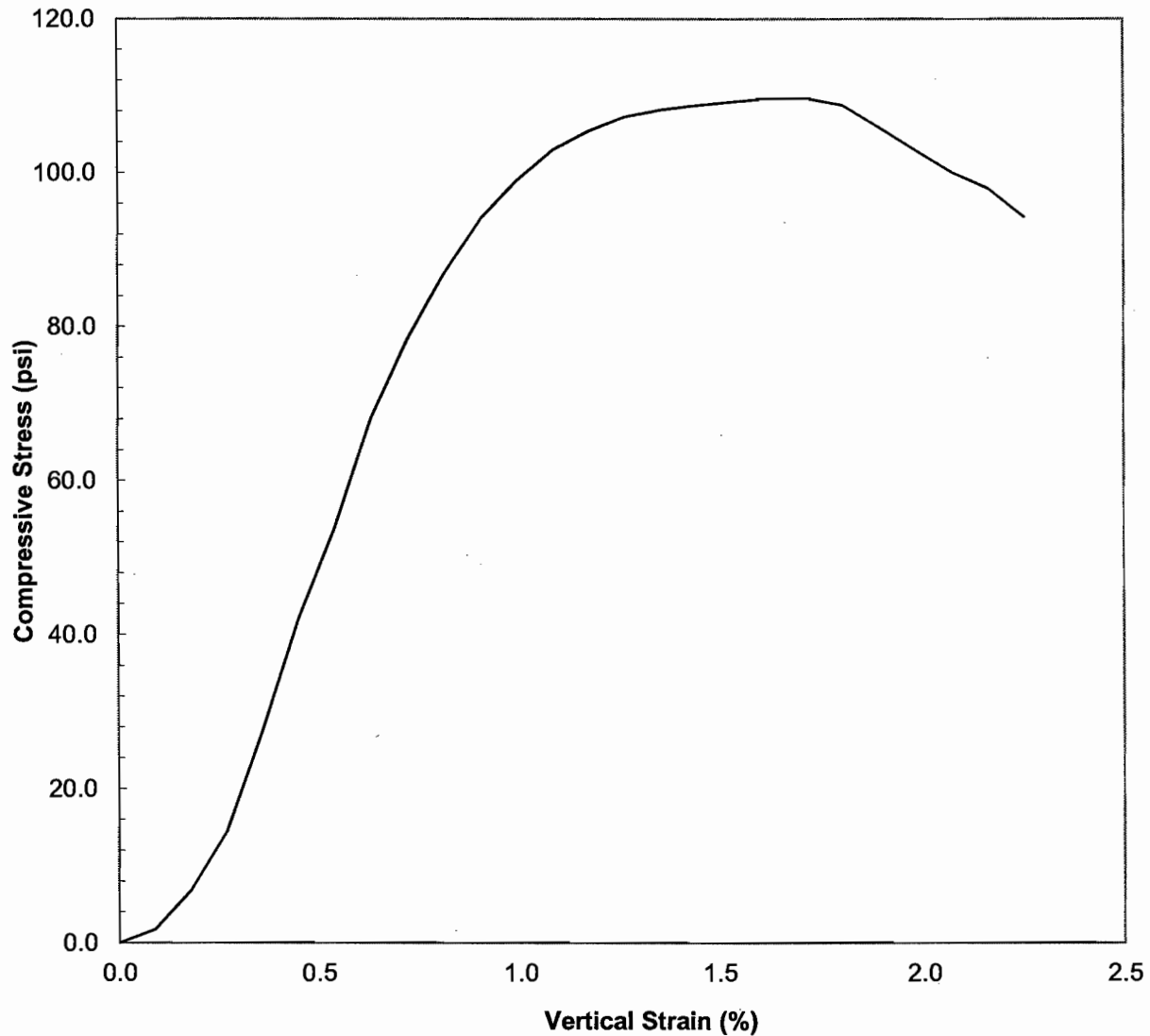
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 24-19, 17 day**

**Depth: N/A**

**ATL Sample No. AT1573S020**







# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

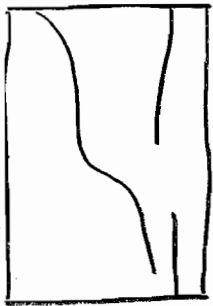
ATL Report No. AT1573SL-21A-12-10

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 24-17

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	12/18/2010
Date of Test	1/03/2011
Age of Sample at Test Date	16 Days
Initial Dry Density (pcf)	65.7
Initial Water Content (%)	56.1
Unconfined Compressive Strength (psi)	131.4
Average Height (in.)	5.512
Average Diameter (in.)	3.004
Height-to-Diameter Ratio	1.83
Average Rate of Strain (%/min)	0.73
Strain at Failure (%)	1.5
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 1/4/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-21A-12-10**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

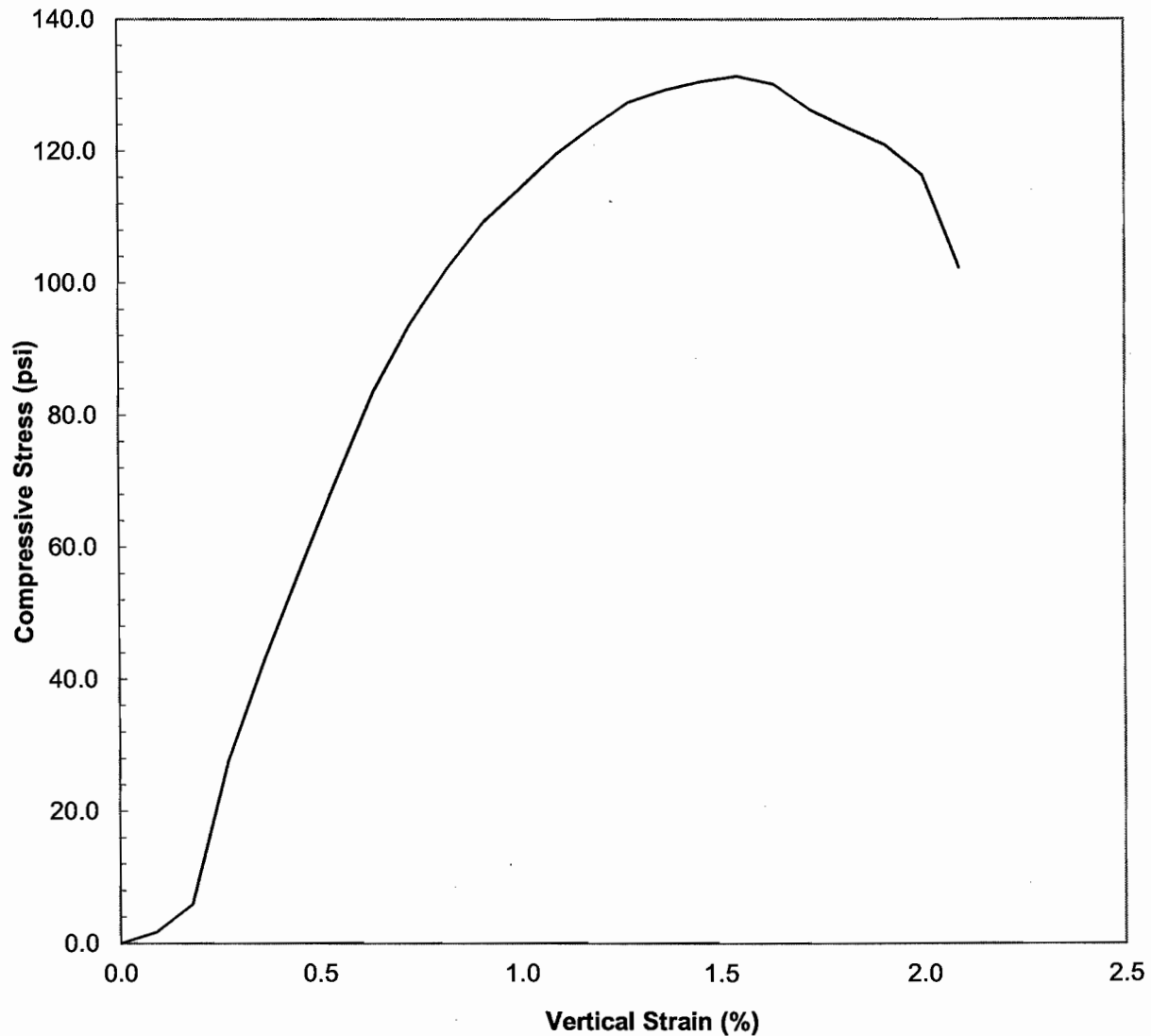
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 24-17, 16 days**

**Depth: N/A**

**ATL Sample No. AT1573S021**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

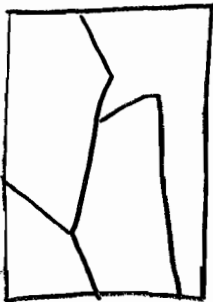
ATL Report No. AT1573SL-23A-12-10

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 29-13

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	1/3/2011
Date of Test	1/17/2011
Age of Sample at Test Date	14 Days
Initial Dry Density (pcf)	67.0
Initial Water Content (%)	54.3
Unconfined Compressive Strength (psi)	121.5
Average Height (in.)	5.669
Average Diameter (in.)	2.992
Height-to-Diameter Ratio	1.89
Average Rate of Strain (%/min)	0.67
Strain at Failure (%)	1.1
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 1/18/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-23A-12-10**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

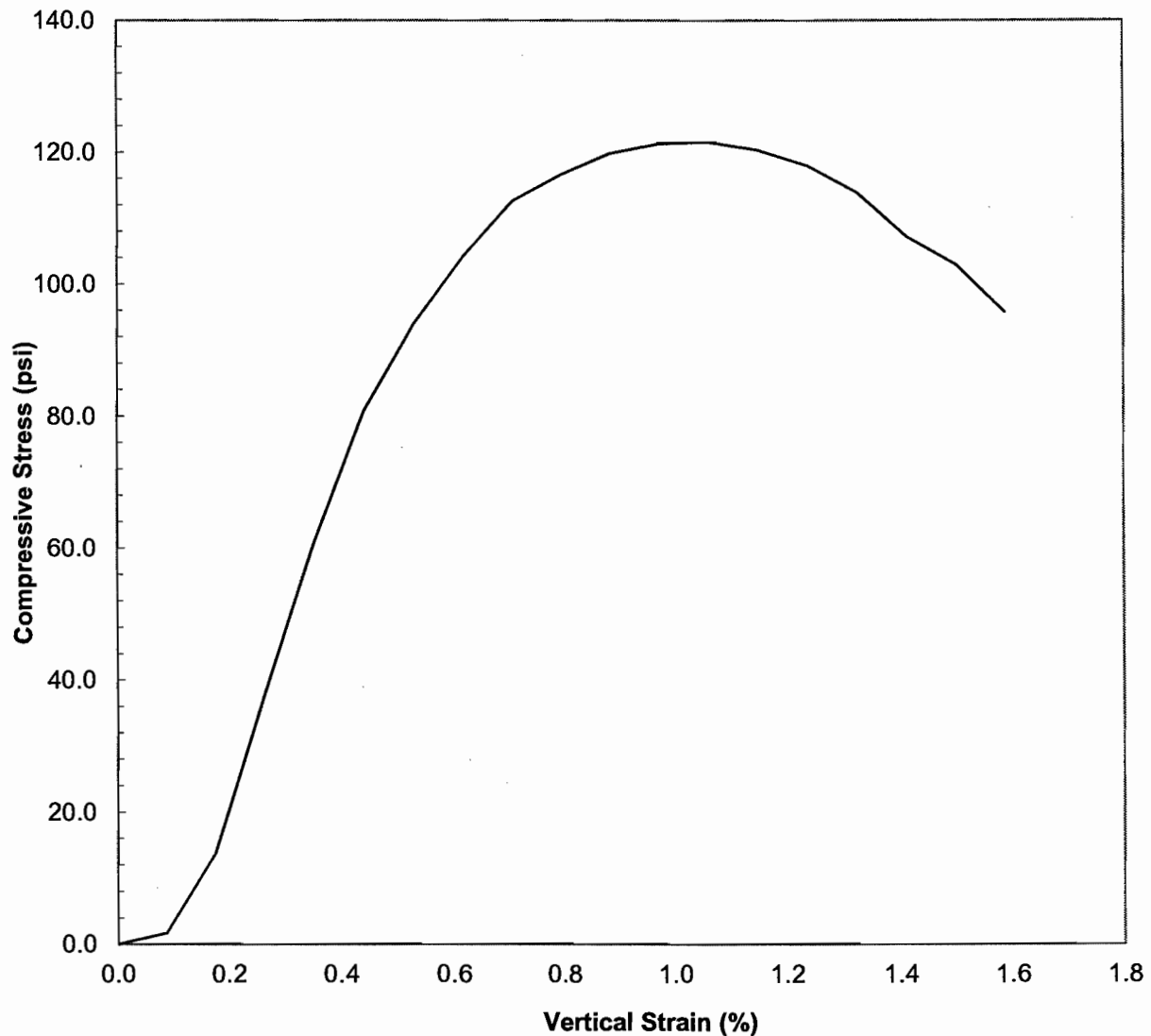
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 29-13, 14 day**

**Depth: N/A**

**ATL Sample No. AT1573S023**





# ATLANTIC TESTING LABORATORIES

**Albany**  
22 Corporate Drive  
Clifton Park, NY 12065  
518-383-9144 (T)  
518-383-9166 (F)

## TRANSMITTAL

January 19, 2011

AECOM  
40 British American Boulevard  
Latham, New York 12110

Attn: Mr. Scott Serviss

E/Mail: [scott.serviss@aecom.com](mailto:scott.serviss@aecom.com)

Re: Soil Laboratory Testing  
NGP Site  
Norwich, New York  
ATL Project No.: AT1573

Dear Mr. Serviss:

Enclosed are the following reports:

AT1573SL-24B-12-10	Unconfined Compressive Strength	January 06, 2011
AT1573SL-31-1-11	Unconfined Compressive Strength	January 13, 2011
AT1573SL-27A-1-11	Hydraulic Conductivity	January 11, 2011
AT1573SL-28A-1-11	Hydraulic Conductivity	January 11, 2011
AT1573SL-29A-1-11	Hydraulic Conductivity	January 11, 2011

Please contact our office should you have any questions or if we may be of further service.

Sincerely,

ATLANTIC TESTING LABORATORIES, Limited

Robert E. Field  
Laboratory Manager  
[bfield@atlantictesting.com](mailto:bfield@atlantictesting.com)

REF/nd

Enclosures



# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

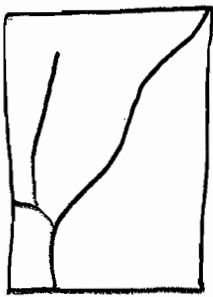
ATL Report No. AT1573SL-24B-12-10

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 32-11

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	1/4/2011
Date of Test	1/18/2011
Age of Sample at Test Date	14 Days
Initial Dry Density (pcf)	77.8
Initial Water Content (%)	41.1
Unconfined Compressive Strength (psi)	354.0
Average Height (in.)	5.630
Average Diameter (in.)	2.999
Height-to-Diameter Ratio	1.88
Average Rate of Strain (%/min)	0.67
Strain at Failure (%)	1.4
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 1/19/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-24B-12-10**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

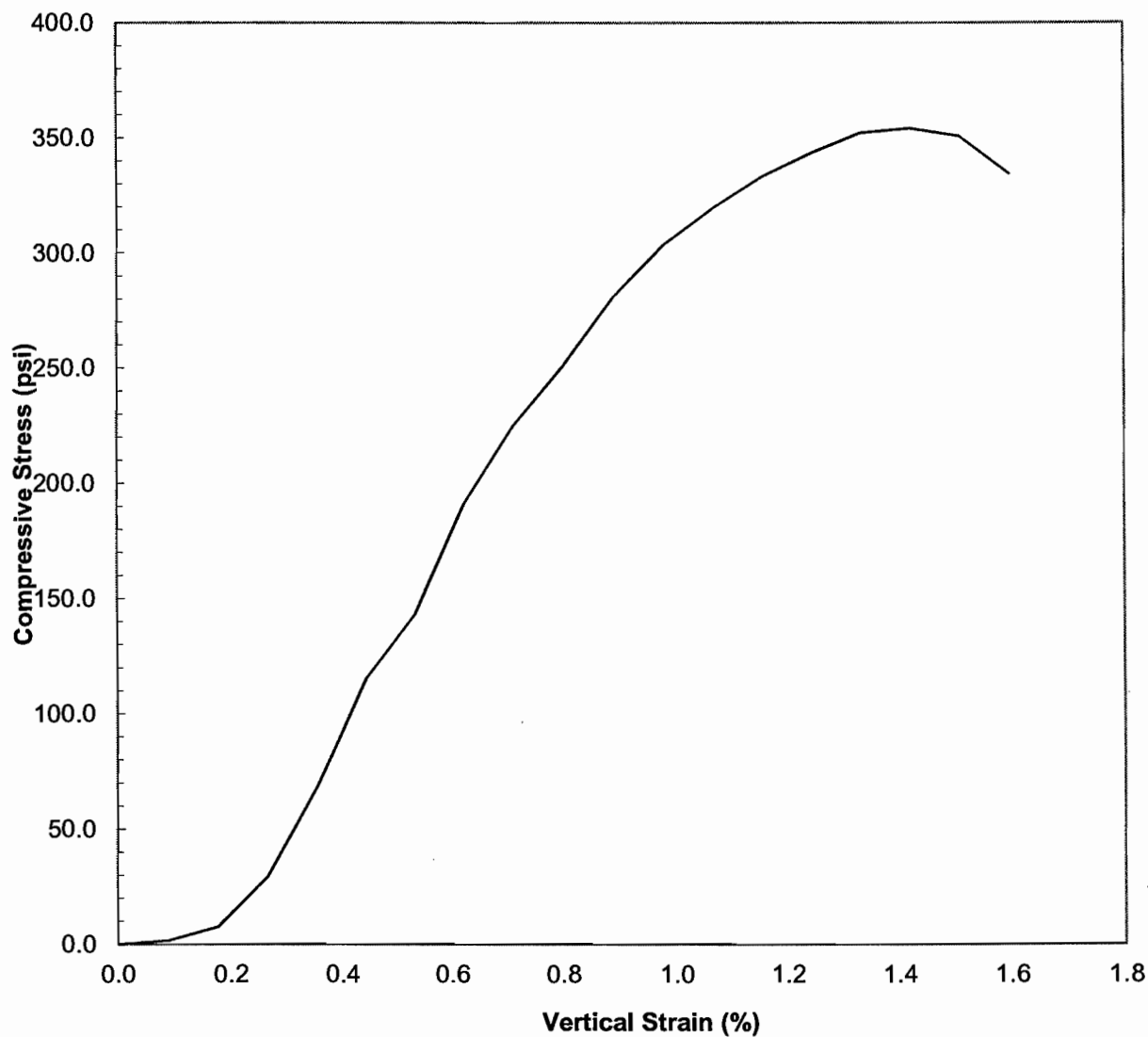
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 32-11, 14 day**

**Depth: N/A**

**ATL Sample No. AT1573S024**





# ATLANTIC TESTING LABORATORIES

**Albany**  
22 Corporate Drive  
Clifton Park, NY 12065  
518-383-9144 (T)  
518-383-9166 (F)

## TRANSMITTAL

January 20, 2011

AECOM  
40 British American Boulevard  
Latham, New York 12110

Attn: Mr. Scott Serviss

E/Mail: [scott.serviss@aecom.com](mailto:scott.serviss@aecom.com)

Re: Soil Laboratory Testing  
NGP Site  
Norwich, New York  
ATL Project No.: AT1573

Dear Mr. Serviss:

Enclosed are the following reports:

AT1573SL-25B-1-11	Unconfined Compressive Strength	January 11, 2011
AT1573SL-32-1-11	Unconfined Compressive Strength	January 19, 2011

Please contact our office should you have any questions or if we may be of further service.

Sincerely,  
ATLANTIC TESTING LABORATORIES, Limited

Robert E. Field  
Laboratory Manager  
[bfield@atlantictesting.com](mailto:bfield@atlantictesting.com)

REF/nd

Enclosures





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

ATL Report No. AT1573SL-25B-1-11

Client: AECOM

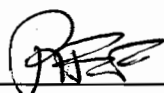
Project: NGP Site, Norwich, New York

Sample ID.: 37-9

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	1/5/2011
Date of Test	1/19/2011
Age of Sample at Test Date	14 Days
Initial Dry Density (pcf)	74.4
Initial Water Content (%)	44.5
Unconfined Compressive Strength (psi)	349.8
Average Height (in.)	5.669
Average Diameter (in.)	3.001
Height-to-Diameter Ratio	1.89
Average Rate of Strain (%/min)	0.65
Strain at Failure (%)	1.6
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 1/20/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-25B-1-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

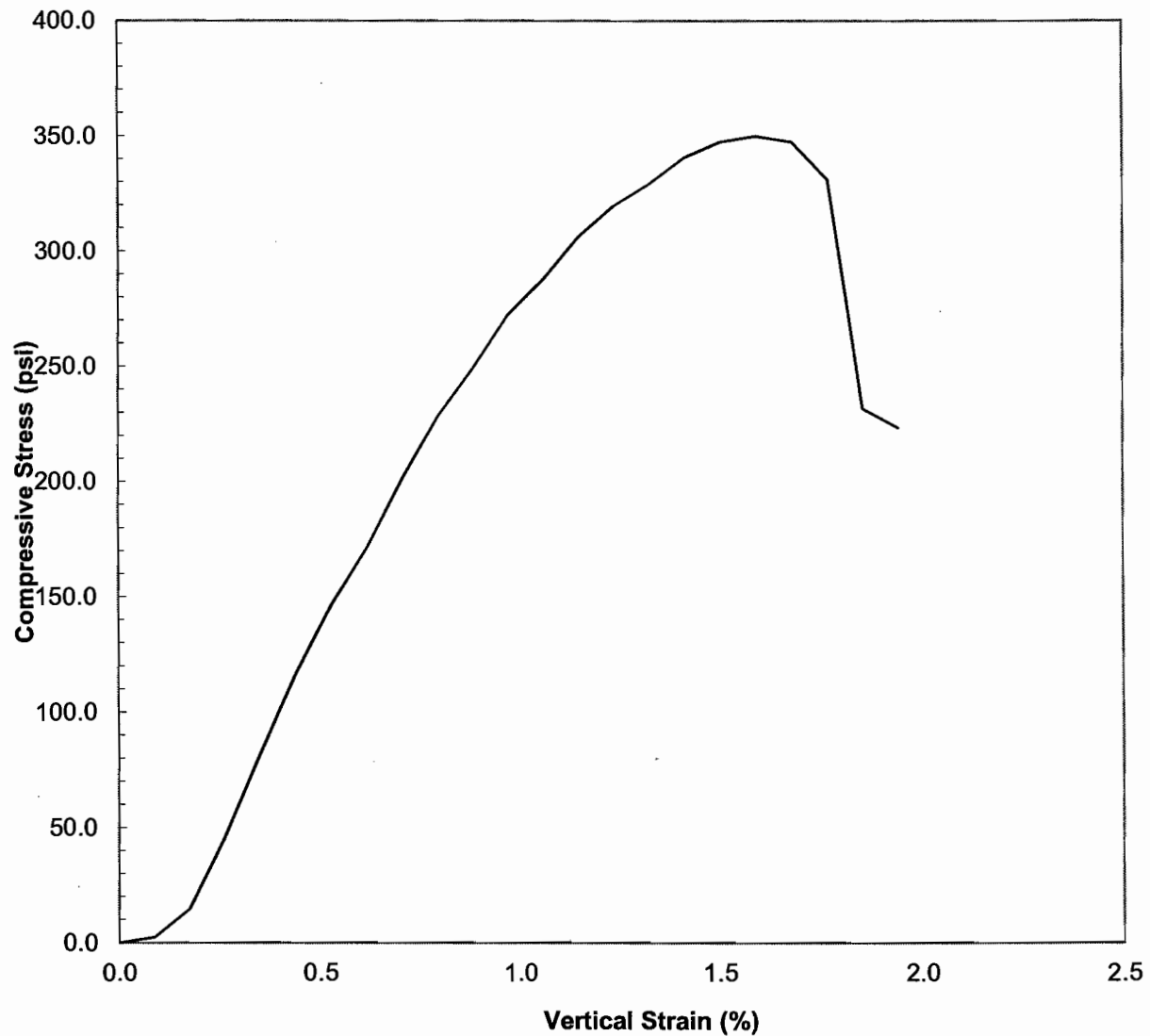
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 37-9, 14 day**

**Depth: N/A**

**ATL Sample No. AT1573S025**





# ATLANTIC TESTING LABORATORIES

**Albany**  
22 Corporate Drive  
Clifton Park, NY 12065  
518-383-9144 (T)  
518-383-9166 (F)

## TRANSMITTAL

January 21, 2011

AECOM  
40 British American Boulevard  
Latham, New York 12110

Attn: Mr. Scott Serviss

E/Mail: [scott.serviss@aecom.com](mailto:scott.serviss@aecom.com)

Re: Soil Laboratory Testing  
NGP Site  
Norwich, New York  
ATL Project No.: AT1573

Dear Mr. Serviss:

Enclosed are the following reports:

AT1573SL-26B-1-11	Unconfined Compressive Strength	January 11, 2011
AT1573SL-33-1-11	Unconfined Compressive Strength	January 19, 2011

Please contact our office should you have any questions or if we may be of further service.

Sincerely,  
*ATLANTIC TESTING LABORATORIES, Limited*

Robert E. Field  
Laboratory Manager  
[bfield@atlantictesting.com](mailto:bfield@atlantictesting.com)

REF/nd

Enclosures



# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166


ATL Report No. AT1573SL-26B-1-11

Client: AECOM


Project: NGP Site, Norwich, New York

Sample ID.: 41-9

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	1/6/2011
Date of Test	1/20/2011
Age of Sample at Test Date	14 Days
Initial Dry Density (pcf)	77.0
Initial Water Content (%)	43.1
Unconfined Compressive Strength (psi)	321.5
Average Height (in.)	5.512
Average Diameter (in.)	3.003
Height-to-Diameter Ratio	1.84
Average Rate of Strain (%/min)	0.65
Strain at Failure (%)	1.5
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 1/21/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-26B-1-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

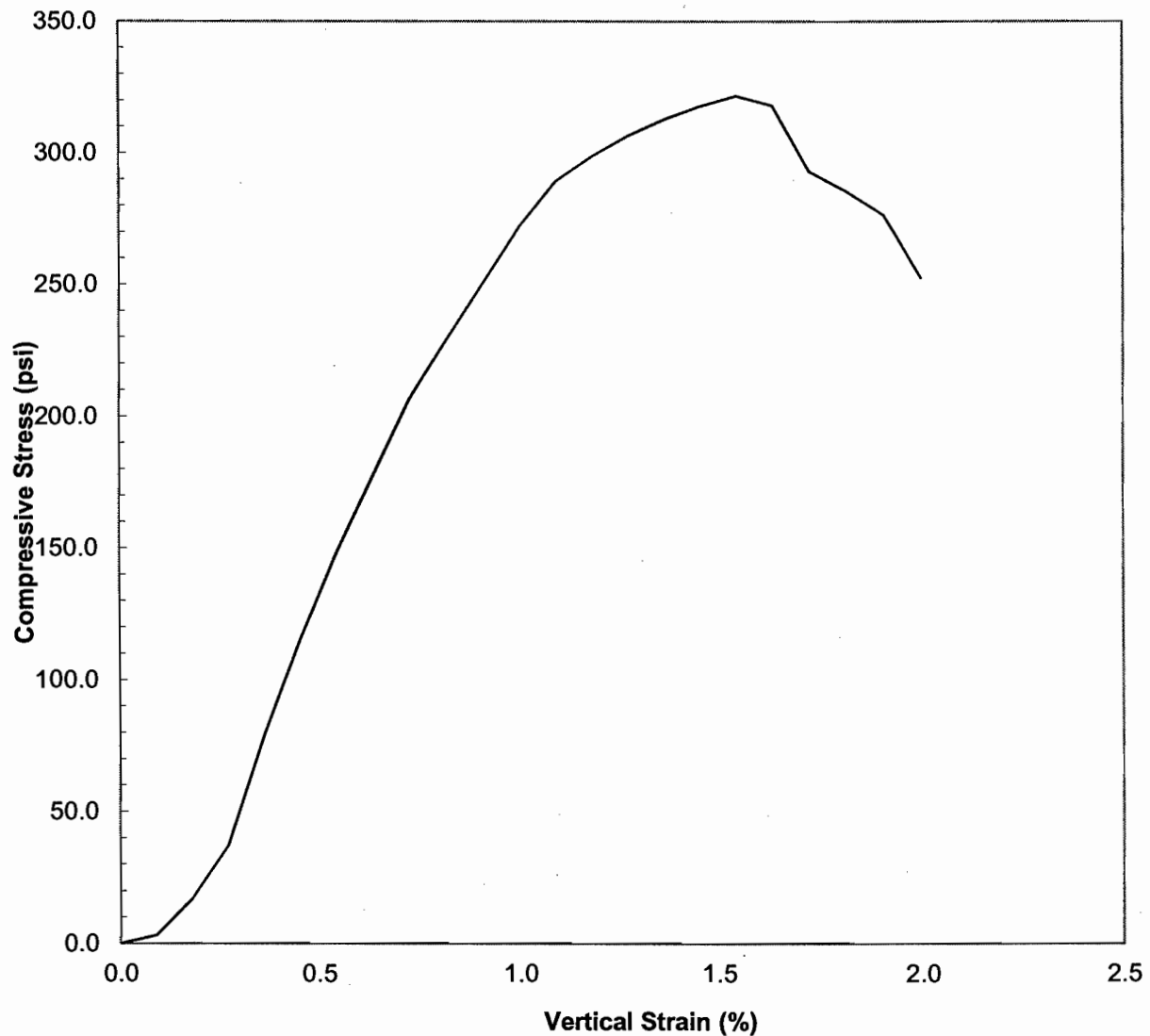
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 41-9, 14 day**

**Depth: N/A**

**ATL Sample No. AT1573S026**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

ATL Report No. AT1573SL-27B-1-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 45-9

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	1/7/2011
Date of Test	1/21/2011
Age of Sample at Test Date	14 Days
Initial Dry Density (pcf)	74.3
Initial Water Content (%)	45.4
Unconfined Compressive Strength (psi)	312.3
Average Height (in.)	5.630
Average Diameter (in.)	2.999
Height-to-Diameter Ratio	1.88
Average Rate of Strain (%/min)	0.66
Strain at Failure (%)	1.7
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by:

Date: 1/24/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-27B-1-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

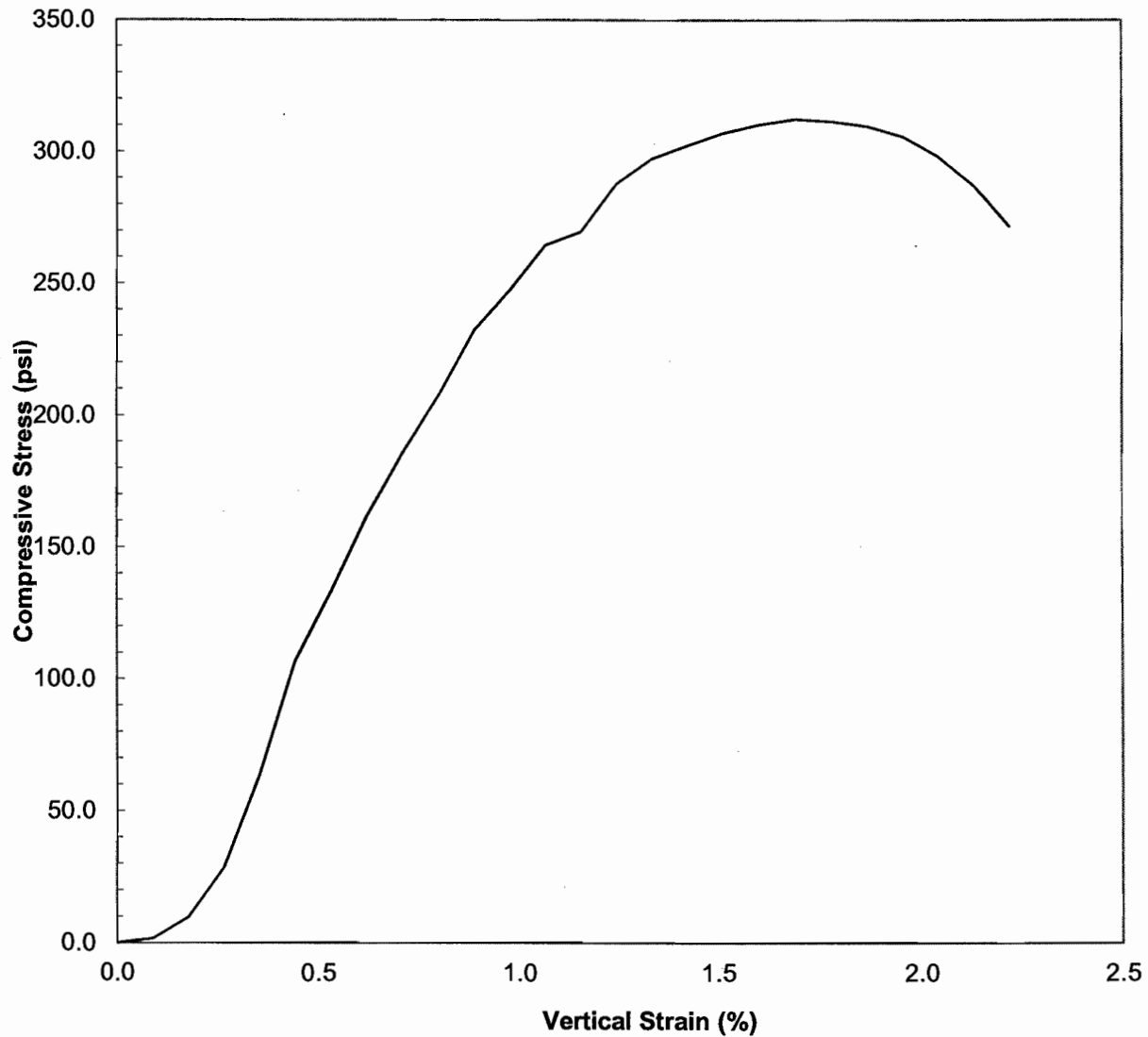
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 45-9, 14 day**

**Depth: N/A**

**ATL Sample No. AT1573S027**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

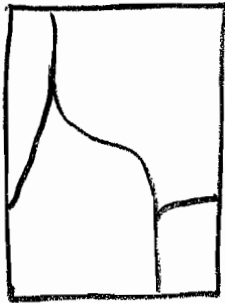
ATL Report No. AT1573SL-28B-1-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 49-9

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	1/7/2011
Date of Test	1/21/2011
Age of Sample at Test Date	14 Days
Initial Dry Density (pcf)	74.3
Initial Water Content (%)	46.1
Unconfined Compressive Strength (psi)	307.3
Average Height (in.)	5.472
Average Diameter (in.)	3.000
Height-to-Diameter Ratio	1.82
Average Rate of Strain (%/min)	0.66
Strain at Failure (%)	1.6
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 1/24/11





# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-28B-1-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

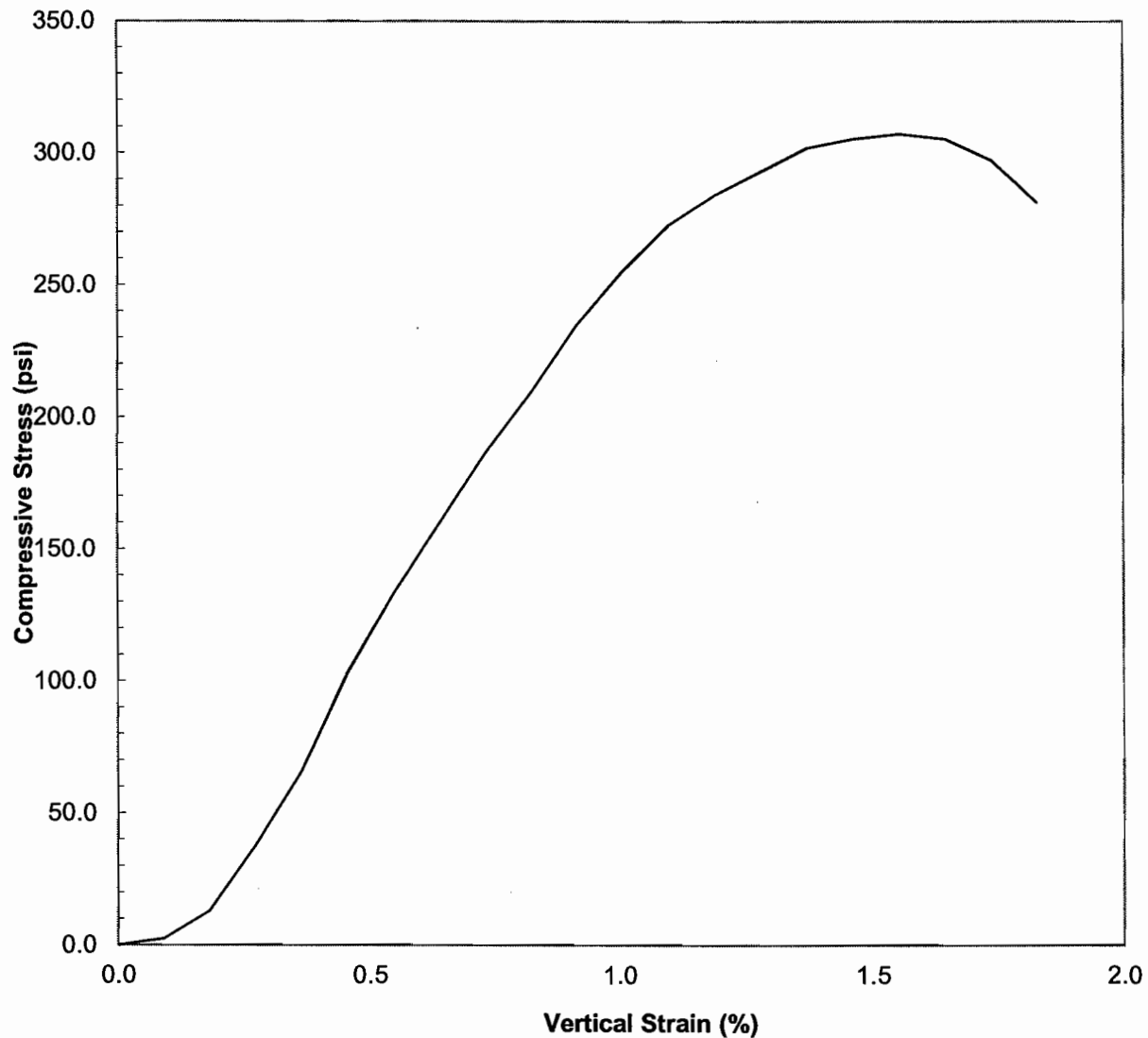
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 49-9, 14 day**

**Depth: N/A**

**ATL Sample No. AT1573S028**





# ATLANTIC TESTING LABORATORIES

**Albany**  
22 Corporate Drive  
Clifton Park, NY 12065  
518-383-9144 (T)  
518-383-9166 (F)

## TRANSMITTAL

January 25, 2011

AECOM  
40 British American Boulevard  
Latham, New York 12110

Attn: Mr. Scott Serviss

E/Mail: [scott.serviss@aecom.com](mailto:scott.serviss@aecom.com)

Re: Soil Laboratory Testing  
NGP Site  
Norwich, New York  
ATL Project No.: AT1573

Dear Mr. Serviss:

Enclosed are the following reports:

AT1573SL-29A-1-11	Unconfined Compressive Strength	January 11, 2011
AT1573SL-30A-1-11	Unconfined Compressive Strength	January 13, 2011
AT1573SL-36-1-11	Unconfined Compressive Strength	January 19, 2011

Please contact our office should you have any questions or if we may be of further service.

Sincerely,  
ATLANTIC TESTING LABORATORIES, Limited

Robert E. Field  
Laboratory Manager  
[bfield@atlantictesting.com](mailto:bfield@atlantictesting.com)

REF/nd

Enclosures



# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

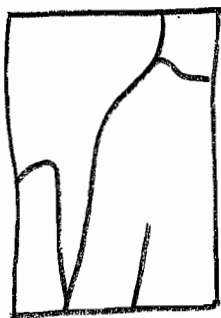
ATL Report No. AT1573SL-29A-1-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 49-5

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	1/8/2011
Date of Test	1/24/2011
Age of Sample at Test Date	16 Days
Initial Dry Density (pcf)	75.7
Initial Water Content (%)	44.1
Unconfined Compressive Strength (psi)	297.8
Average Height (in.)	5.669
Average Diameter (in.)	3.000
Height-to-Diameter Ratio	1.89
Average Rate of Strain (%/min)	0.65
Strain at Failure (%)	1.6
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 1/23/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-29A-1-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

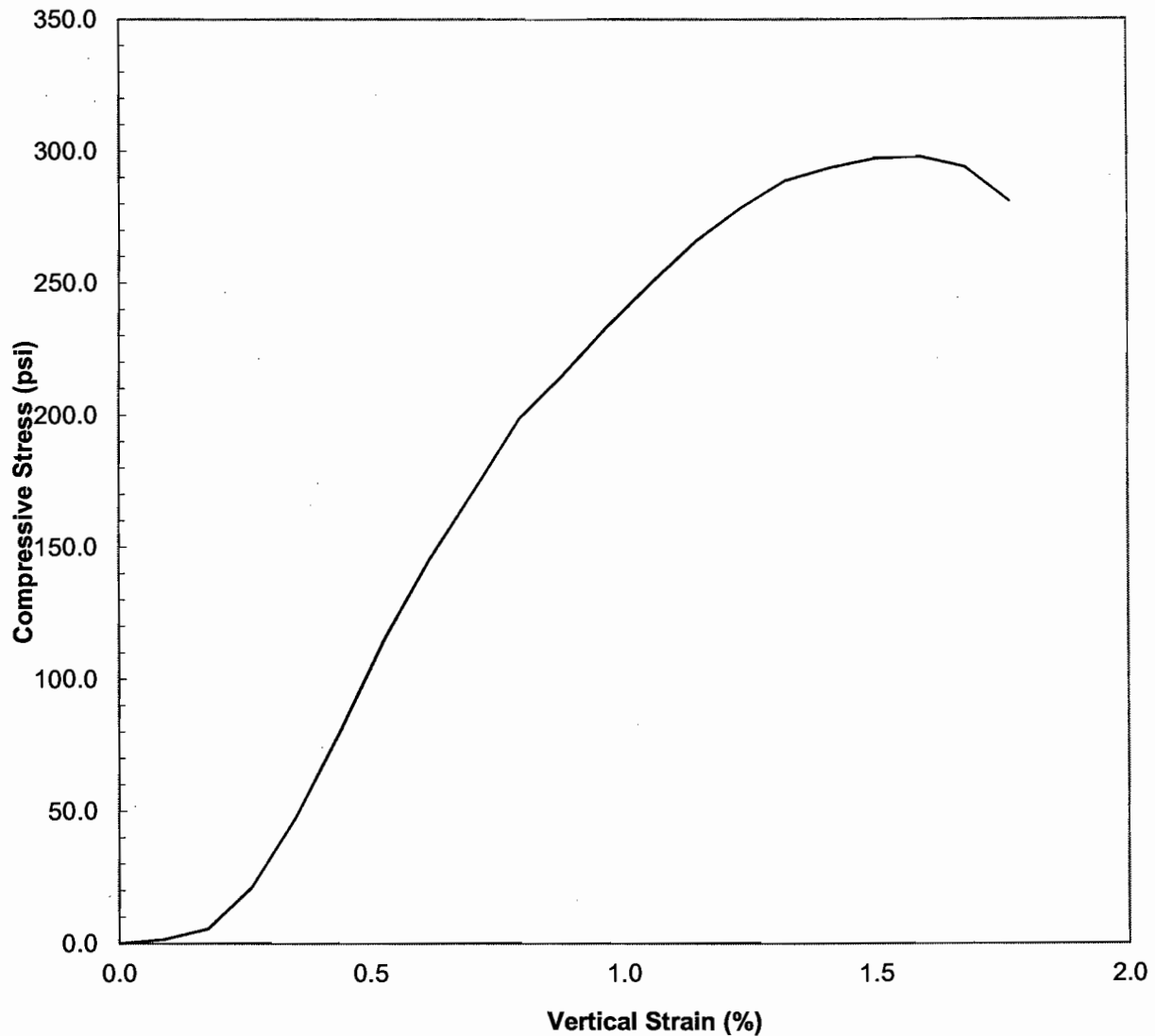
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 49-5, 16 day**

**Depth: N/A**

**ATL Sample No. AT1573S029**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

ATL Report No. AT1573SL-30A-1-11

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 48-3

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	1/10/2011
Date of Test	1/24/2011
Age of Sample at Test Date	14 Days
Initial Dry Density (pcf)	77.3
Initial Water Content (%)	42.9
Unconfined Compressive Strength (psi)	156.7
Average Height (in.)	5.433
Average Diameter (in.)	3.003
Height-to-Diameter Ratio	1.81
Average Rate of Strain (%/min)	0.68
Strain at Failure (%)	1.4
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by:

Date: 1/25/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-30A-1-11**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

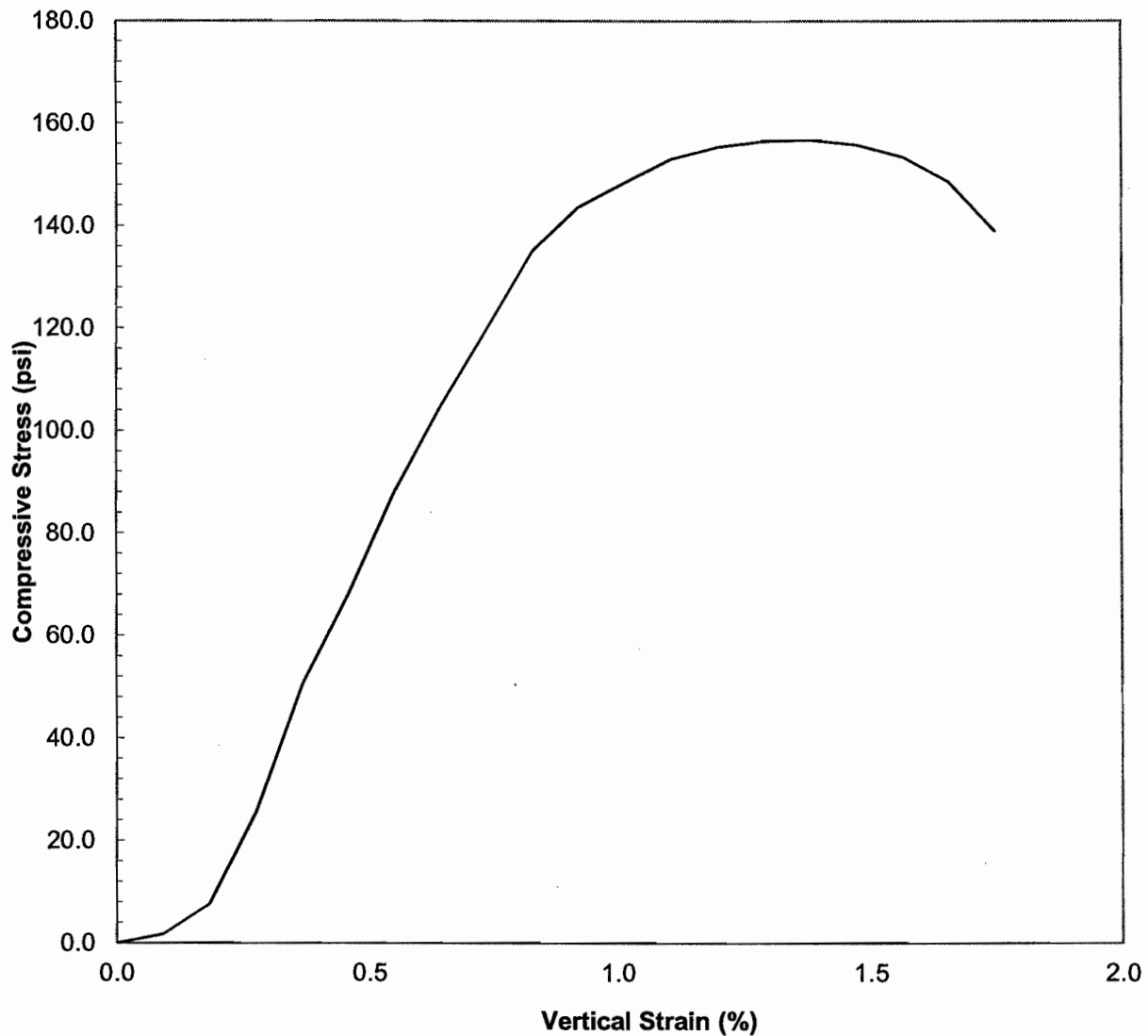
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 48-3, 14 day**

**Depth: N/A**

**ATL Sample No. AT1573S030**





# ATLANTIC TESTING LABORATORIES

**Albany**  
22 Corporate Drive  
Clifton Park, NY 12065  
518-383-9144 (T)  
518-383-9166 (F)

## TRANSMITTAL

January 3, 2011

AECOM  
40 British American Boulevard  
Latham, New York 12110

Attn: Mr. Scott Serviss

E/Mail: [scott.serviss@aecom.com](mailto:scott.serviss@aecom.com)

Re: Soil Laboratory Testing  
NGP Site  
Norwich, New York  
ATL Project No.: AT1573

Dear Mr. Serviss:

Enclosed are the following reports:

AT1573SL-01C-12-10	Unconfined Compressive Strength	December 07, 2010
AT1573SL-02C-12-10	Unconfined Compressive Strength	December 07, 2010
AT1573SL-18A-12-10	Unconfined Compressive Strength	December 21, 2010
AT1573SL-19A-12-10	Unconfined Compressive Strength	December 21, 2010

Please contact our office should you have any questions or if we may be of further service.

Sincerely,  
ATLANTIC TESTING LABORATORIES, Limited

Robert E. Field  
Laboratory Manager  
[bfield@atlantictesting.com](mailto:bfield@atlantictesting.com)

REF/nd

Enclosures



# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166


ATL Report No. AT1573SL-01C-12-10

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 14-26, 28 days

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	12/02/10
Date of Test	12/30/10
Age of Sample at Test Date	28 days
Initial Dry Density (pcf)	70.4
Initial Water Content (%)	51.2
Unconfined Compressive Strength (psi)	224.9
Average Height (in.)	5.472
Average Diameter (in.)	2.988
Height-to-Diameter Ratio	1.83
Average Rate of Strain (%/min)	0.68
Strain at Failure (%)	1.3
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.  
There were numerous small air voids noted on this sample.

Reviewed by: 

Date: 1/3/11





# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-01C-12-10**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

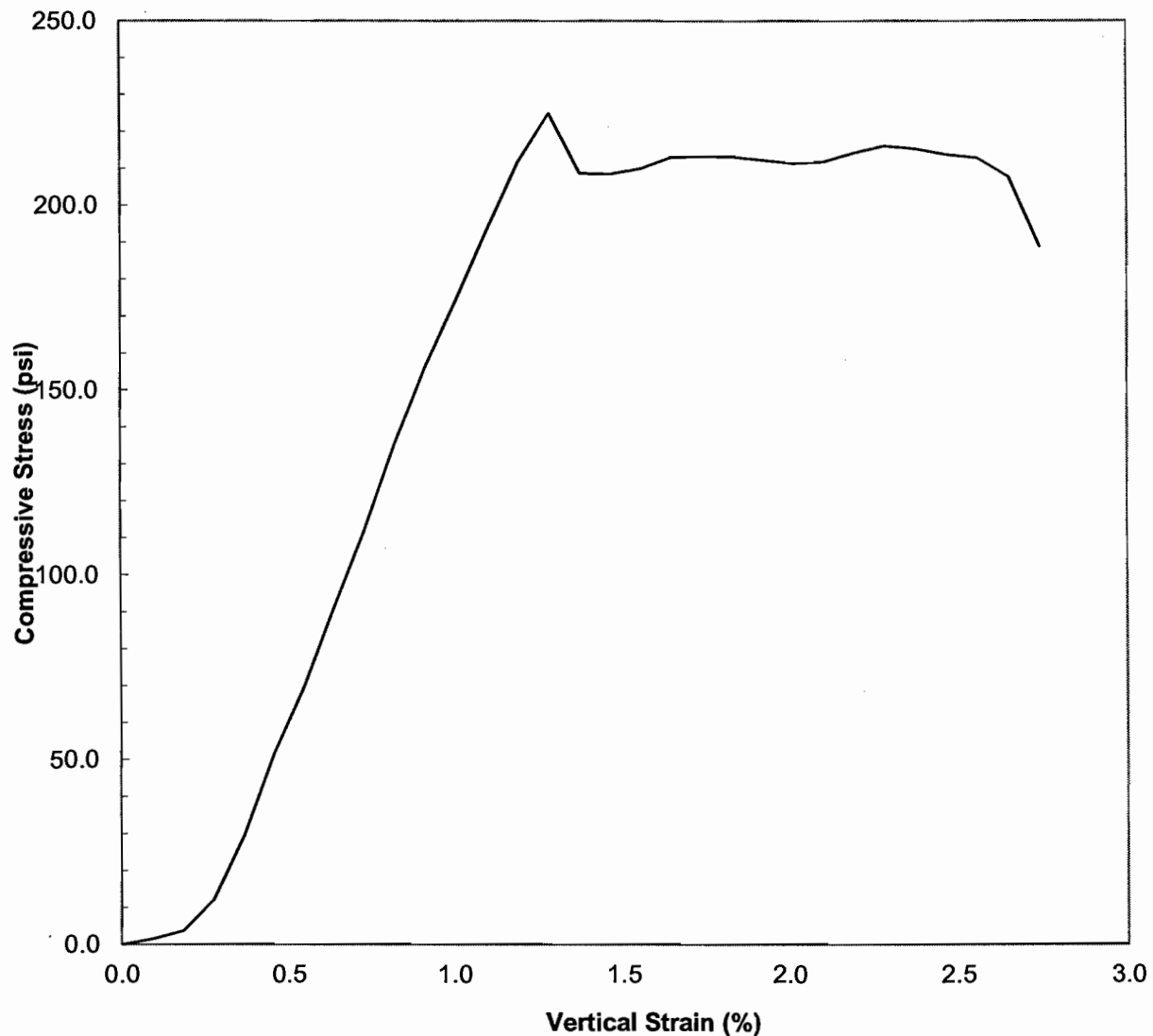
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 14-26, 28 days**

**Depth: N/A**

**ATL Sample No. AT1573S01**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

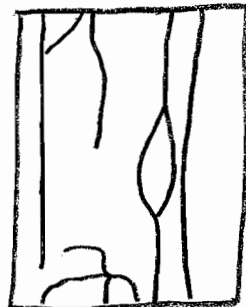
ATL Report No. AT1573SL-02C-12-10

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 14-27, 28 days

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	12/02/2010
Date of Test	12/30/2010
Age of Sample at Test Date	28 days
Initial Dry Density (pcf)	66.6
Initial Water Content (%)	55.2
Unconfined Compressive Strength (psi)	233.8
Average Height (in.)	5.315
Average Diameter (in.)	2.996
Height-to-Diameter Ratio	1.77
Average Rate of Strain (%/min)	0.68
Strain at Failure (%)	2.2
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: REF

Date: 1/3/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-18A-12-10**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

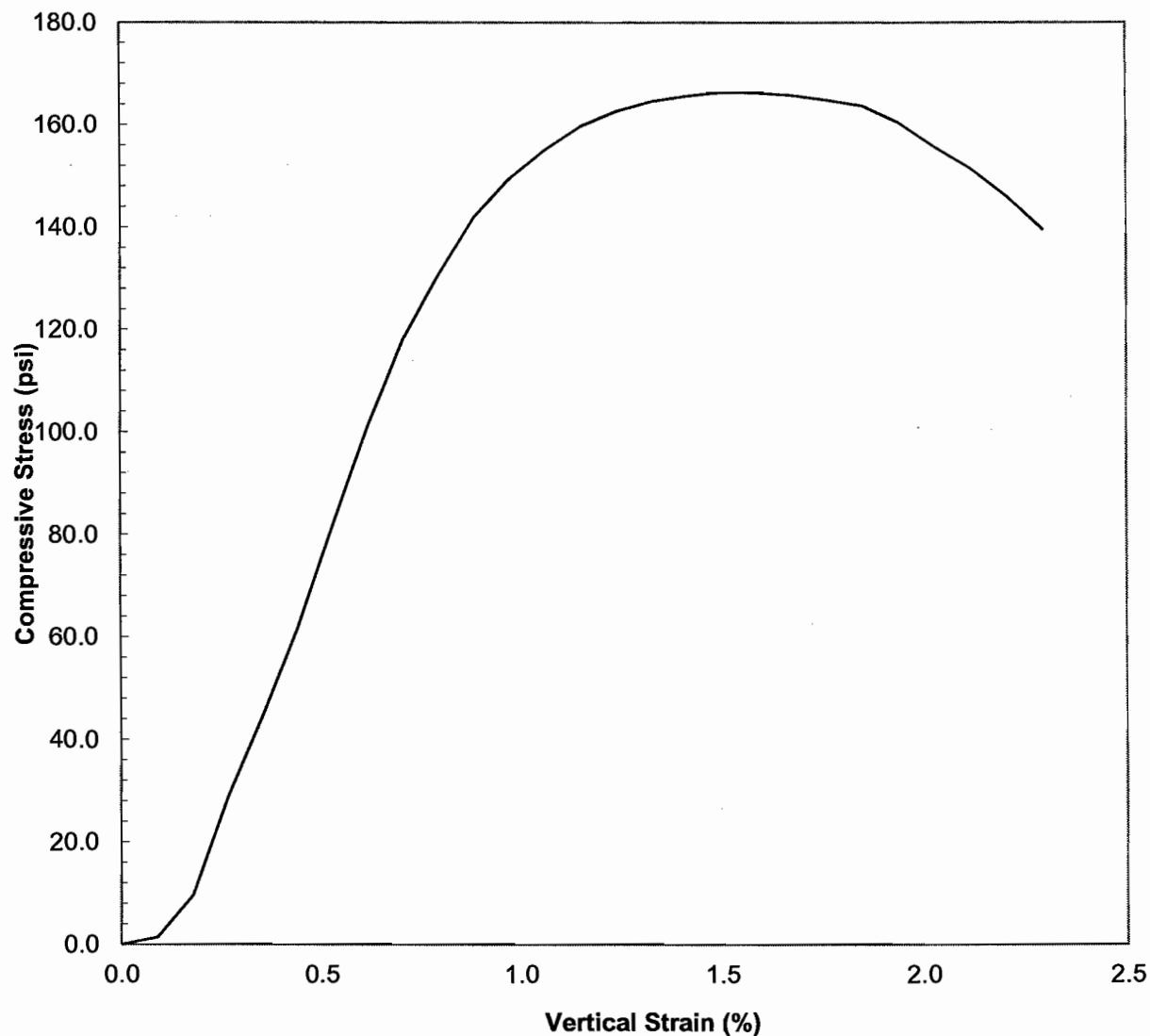
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 17-22, 14 day**

**Depth: N/A**

**ATL Sample No. AT1573S018**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

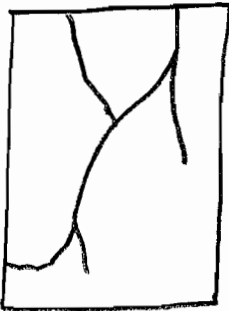
ATL Report No. AT1573SL-19A-12-10

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 21-21

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	12/16/2010
Date of Test	12/30/2010
Age of Sample at Test Date	14 Days
Initial Dry Density (pcf)	69.5
Initial Water Content (%)	51.5
Unconfined Compressive Strength (psi)	103.0
Average Height (in.)	5.394
Average Diameter (in.)	2.988
Height-to-Diameter Ratio	1.81
Average Rate of Strain (%/min)	0.69
Strain at Failure (%)	1.7
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 1/3/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-19A-12-10**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

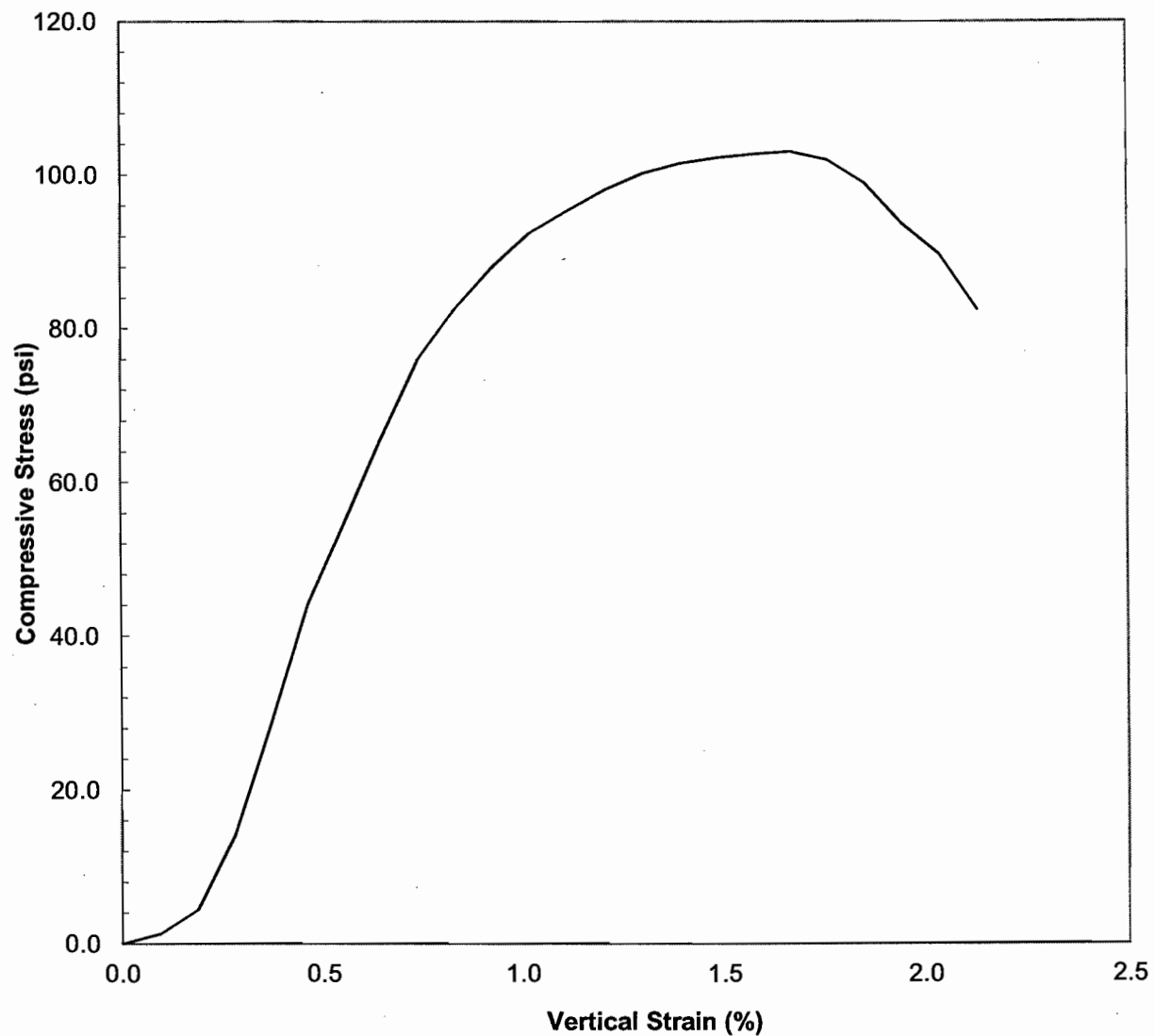
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 21-21, 14 days**

**Depth: N/A**

**ATL Sample No. AT1573S019**





# ATLANTIC TESTING LABORATORIES

**Albany**  
22 Corporate Drive  
Clifton Park, NY 12065  
518-383-9144 (T)  
518-383-9166 (F)

## TRANSMITTAL

January 4, 2011

AECOM  
40 British American Boulevard  
Latham, New York 12110

Attn: Mr. Scott Serviss

E/Mail: [scott.serviss@aecom.com](mailto:scott.serviss@aecom.com)

Re: Soil Laboratory Testing  
NGP Site  
Norwich, New York  
ATL Project No.: AT1573

Dear Mr. Serviss:

Enclosed are the following reports:

AT1573SL-03C-12-10	Unconfined Compressive Strength	December 07, 2010
AT1573SL-04C-12-10	Unconfined Compressive Strength	December 07, 2010
AT1573SL-05C-12-10	Unconfined Compressive Strength	December 10, 2010
AT1573SL-20A-12-10	Unconfined Compressive Strength	December 21, 2010
AT1573SL-21A-12-10	Unconfined Compressive Strength	December 21, 2010

Please contact our office should you have any questions or if we may be of further service.

Sincerely,

ATLANTIC TESTING LABORATORIES, Limited

Robert E. Field  
Laboratory Manager  
[bfield@atlantictesting.com](mailto:bfield@atlantictesting.com)

REF/nd

Enclosures



# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

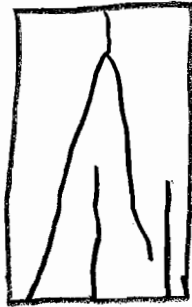
ATL Report No. AT1573SL-03C-12-10

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 14-28, 31 days

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	12/03/2010
Date of Test	1/03/2011
Age of Sample at Test Date	31 days
Initial Dry Density (pcf)	69.2
Initial Water Content (%)	50.3
Unconfined Compressive Strength (psi)	214.4
Average Height (in.)	5.472
Average Diameter (in.)	3.004
Height-to-Diameter Ratio	1.82
Average Rate of Strain (%/min)	0.75
Strain at Failure (%)	1.7
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 1/4/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-03C-12-10**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

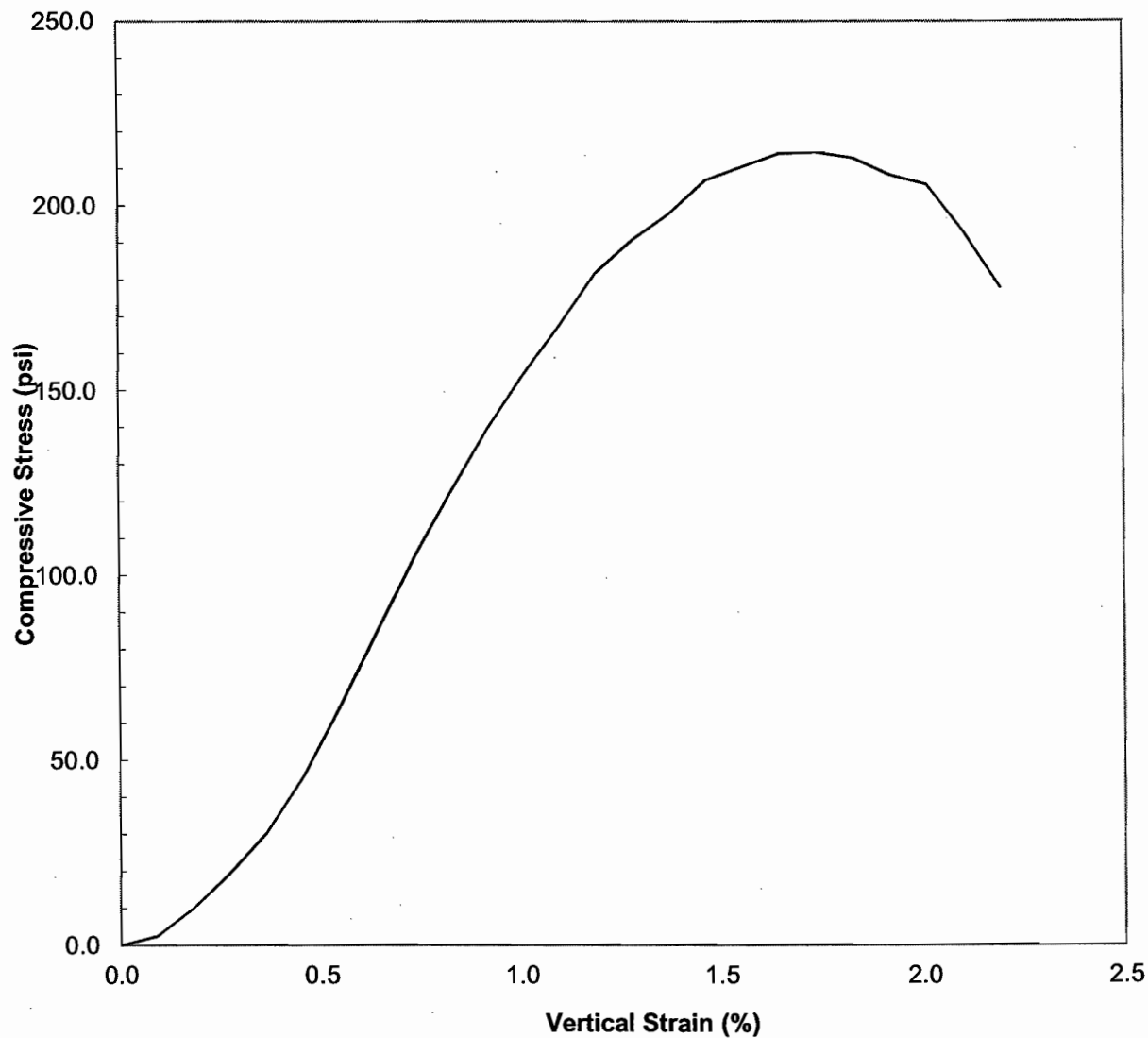
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 14-28, 31 days**

**Depth: N/A**

**ATL Sample No. AT1573S03**







# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166


ATL Report No. AT1573SL-04C-12-10

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 13-30

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	12/04/2010
Date of Test	1/03/2011
Age of Sample at Test Date	30 days
Initial Dry Density (pcf)	70.2
Initial Water Content (%)	49.8
Unconfined Compressive Strength (psi)	167.1
Average Height (in.)	5.354
Average Diameter (in.)	3.000
Height-to-Diameter Ratio	1.78
Average Rate of Strain (%/min)	0.75
Strain at Failure (%)	1.6
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 1/4/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-04C-12-10**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

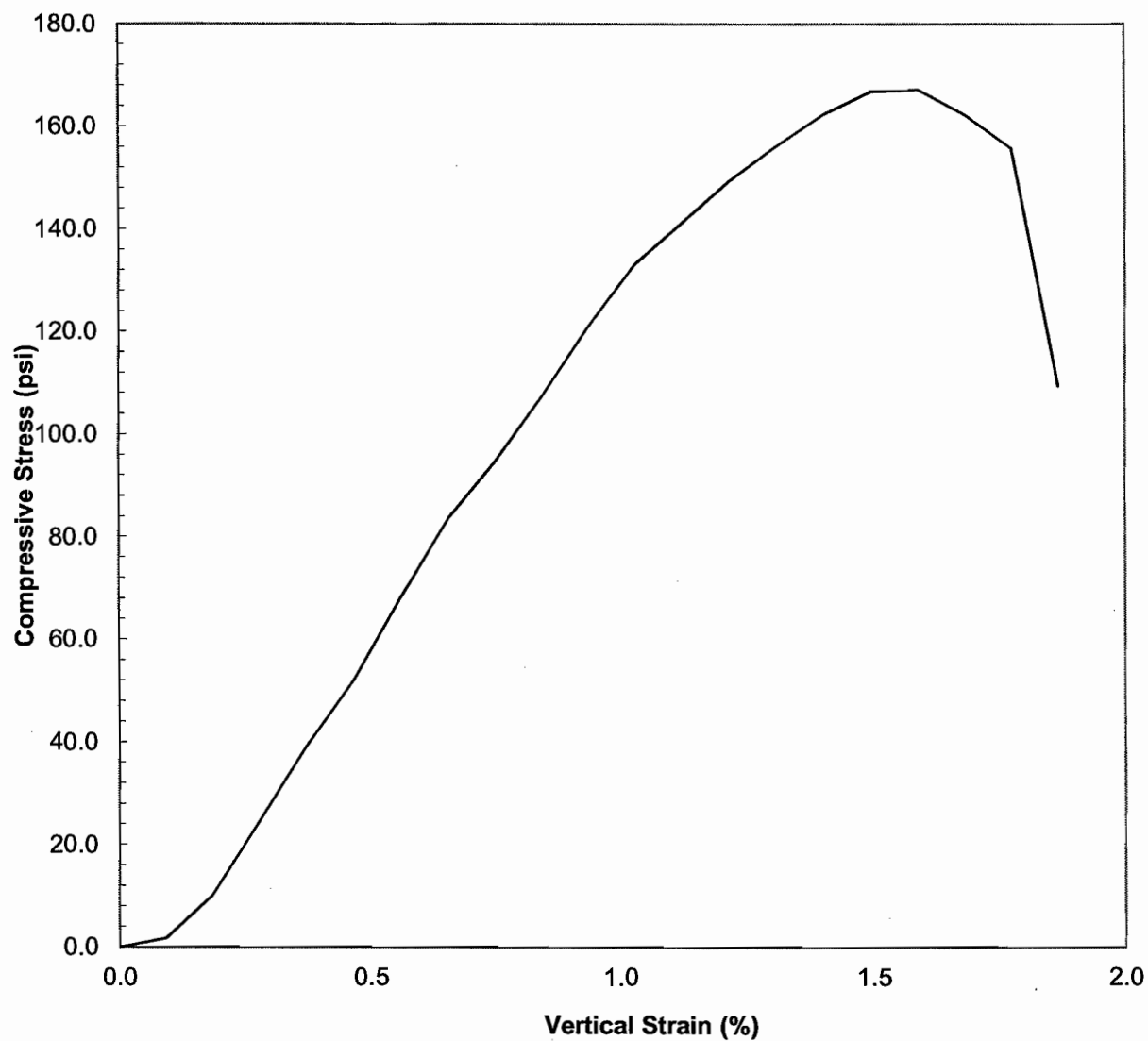
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 13-30, 30 day**

**Depth: N/A**

**ATL Sample No. AT1573S04**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

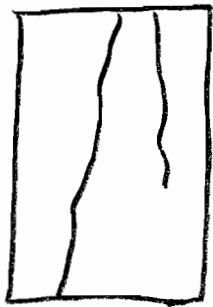
ATL Report No. AT1573SL-05C-12-10

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 12-30

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	12/6/10
Date of Test	1/03/2011
Age of Sample at Test Date	28 days
Initial Dry Density (pcf)	67.1
Initial Water Content (%)	53.6
Unconfined Compressive Strength (psi)	110.1
Average Height (in.)	5.354
Average Diameter (in.)	3.000
Height-to-Diameter Ratio	1.78
Average Rate of Strain (%/min)	0.73
Strain at Failure (%)	1.7
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 1/4/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-05C-12-10**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

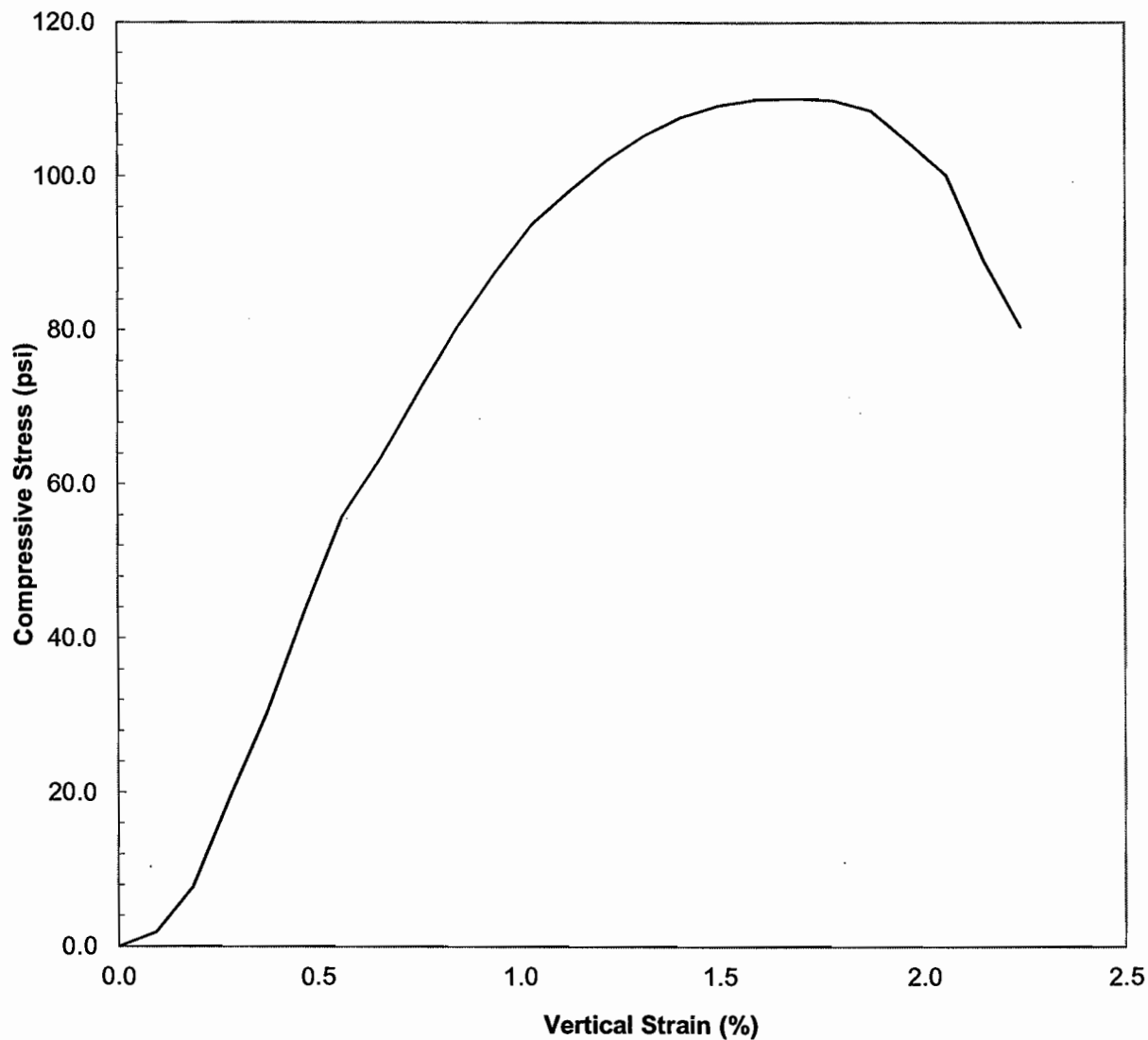
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 12-30, 28 days**

**Depth: N/A**

**ATL Sample No. AT1573S05**





# ATLANTIC TESTING LABORATORIES

**Albany**  
22 Corporate Drive  
Clifton Park, NY 12065  
518-383-9144 (T)  
518-383-9166 (F)

## TRANSMITTAL

January 5, 2011

AECOM  
40 British American Boulevard  
Latham, New York 12110

Attn: Mr. Scott Serviss

E/Mail: [scott.serviss@aecom.com](mailto:scott.serviss@aecom.com)

Re: Soil Laboratory Testing  
NGP Site  
Norwich, New York  
ATL Project No.: AT1573

Dear Mr. Serviss:

Enclosed are the following reports:

AT1573SL-06C-12-10	Unconfined Compressive Strength	December 10, 2010
AT1573SL-22-12-10	Unconfined Compressive Strength	January 04, 2010

Please contact our office should you have any questions or if we may be of further service.

Sincerely,  
*ATLANTIC TESTING LABORATORIES, Limited*

Robert E. Field  
Laboratory Manager  
[bfield@atlantictesting.com](mailto:bfield@atlantictesting.com)

REF/nd

Enclosures



# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166


ATL Report No. AT1573SL-06C-12-10

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 11-30

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	12/7/10
Date of Test	1/4/2011
Age of Sample at Test Date	28 days
Initial Dry Density (pcf)	72.6
Initial Water Content (%)	45.6
Unconfined Compressive Strength (psi)	169.4
Average Height (in.)	5.472
Average Diameter (in.)	3.000
Height-to-Diameter Ratio	1.82
Average Rate of Strain (%/min)	0.73
Strain at Failure (%)	1.6
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 1/5/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-06C-12-10**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

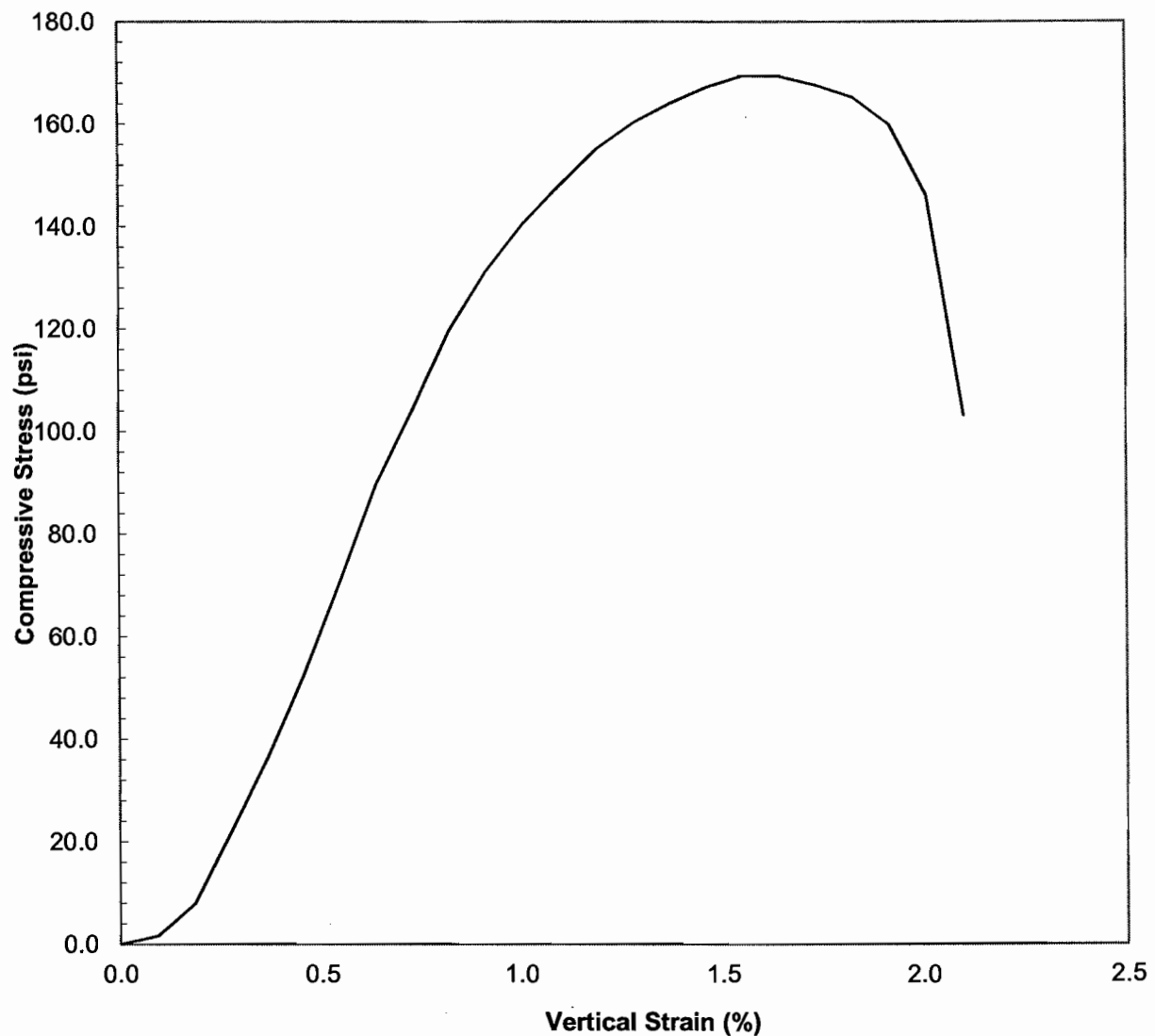
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 11-30, 28 day**

**Depth: N/A**

**ATL Sample No. AT1573S06**





# ATLANTIC TESTING LABORATORIES

**Albany**  
22 Corporate Drive  
Clifton Park, NY 12065  
518-383-9144 (T)  
518-383-9166 (F)

## TRANSMITTAL

January 6, 2011

AECOM  
40 British American Boulevard  
Latham, New York 12110

Attn: Mr. Scott Serviss

E/Mail: [scott.serviss@aecom.com](mailto:scott.serviss@aecom.com)

Re: Soil Laboratory Testing  
NGP Site  
Norwich, New York  
ATL Project No.: AT1573

Dear Mr. Serviss:

Enclosed are the following reports:

AT1573SL-07C-12-10	Unconfined Compressive Strength	December 10, 2010
AT1573SL-08C-12-10	Unconfined Compressive Strength	December 10, 2010
AT1573SL-15B-12-10	Hydraulic Conductivity	December 21, 2010

Please contact our office should you have any questions or if we may be of further service.

Sincerely,  
ATLANTIC TESTING LABORATORIES, Limited

Robert E. Field  
Laboratory Manager  
[bfield@atlantictesting.com](mailto:bfield@atlantictesting.com)

REF/nd

Enclosures





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

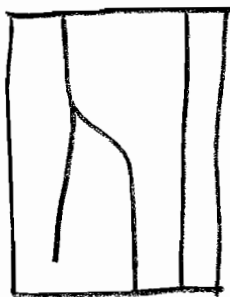
ATL Report No. AT1573SL-07C-12-10

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: T6-20

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	12/8/10
Date of Test	1/5/2011
Age of Sample at Test Date	28 days
Initial Dry Density (pcf)	81.4
Initial Water Content (%)	37.5
Unconfined Compressive Strength (psi)	279.8
Average Height (in.)	5.748
Average Diameter (in.)	3.000
Height-to-Diameter Ratio	1.92
Average Rate of Strain (%/min)	0.70
Strain at Failure (%)	1.7
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: REF

Date: 1/6/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-07C-12-10**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

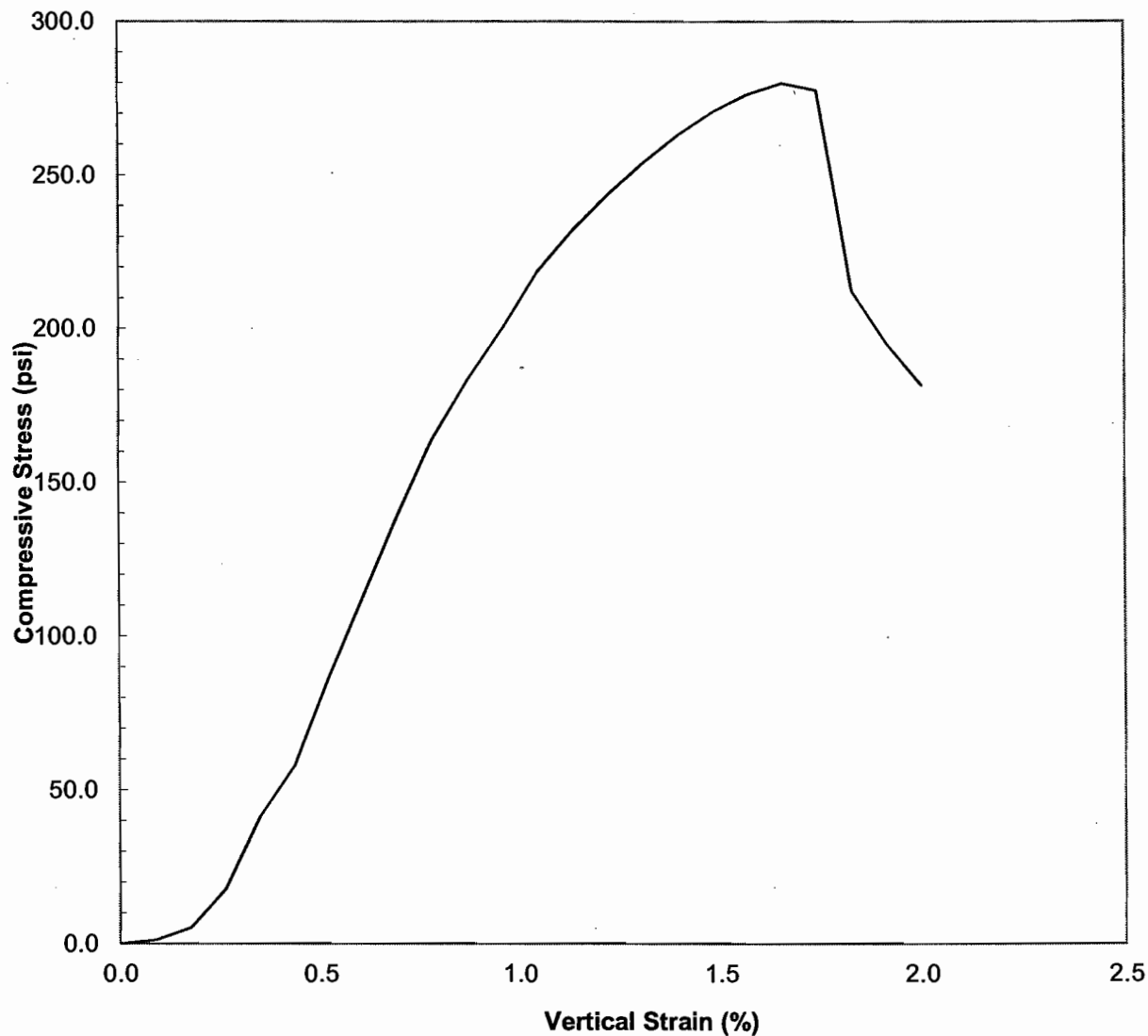
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: T6-20, 28 days**

**Depth: N/A**

**ATL Sample No. AT1573S07**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

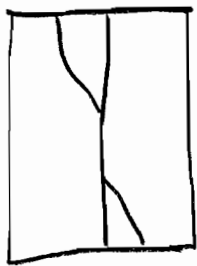
ATL Report No. AT1573SL-08C-12-10

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 6-29

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	12/8/10
Date of Test	1/5/2011
Age of Sample at Test Date	28 days
Initial Dry Density (pcf)	71.0
Initial Water Content (%)	48.2
Unconfined Compressive Strength (psi)	219.8
Average Height (in.)	5.551
Average Diameter (in.)	3.004
Height-to-Diameter Ratio	1.85
Average Rate of Strain (%/min)	0.72
Strain at Failure (%)	1.4
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 1/6/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-08C-12-10**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

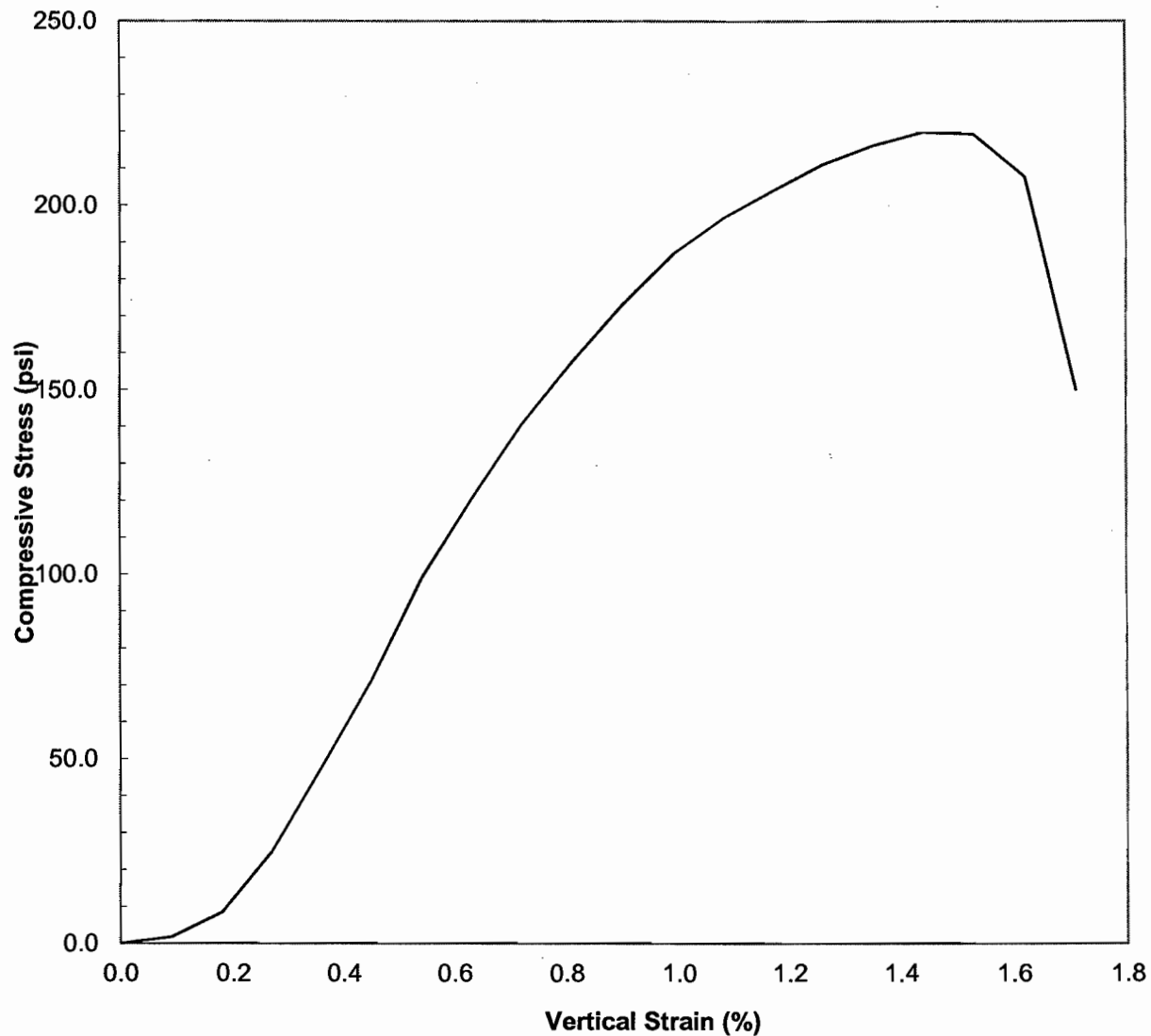
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 6-29, 28 days**

**Depth: N/A**

**ATL Sample No. AT1573S08**





# ATLANTIC TESTING LABORATORIES

## Albany

22 Corporate Drive  
Clifton Park, NY 12065  
518-383-9144 (T)  
518-383-9166 (F)

## TRANSMITTAL

January 7, 2011

AECOM  
40 British American Boulevard  
Latham, New York 12110

Attn: Mr. Scott Serviss

E/Mail: [scott.serviss@aecom.com](mailto:scott.serviss@aecom.com)

Re: Soil Laboratory Testing  
NGP Site  
Norwich, New York  
ATL Project No.: AT1573

Dear Mr. Serviss:

Enclosed are the following reports:

AT1573SL-09C-12-10	Unconfined Compressive Strength	December 09, 2010
AT1573SL-10C-12-10	Unconfined Compressive Strength	December 09, 2010
AT1573SL-11C-12-10	Unconfined Compressive Strength	December 09, 2010
AT1573SL-12C-12-10	Unconfined Compressive Strength	December 09, 2010

Please contact our office should you have any questions or if we may be of further service.

Sincerely,  
ATLANTIC TESTING LABORATORIES, Limited

Robert E. Field  
Laboratory Manager  
[bfield@atlantictesting.com](mailto:bfield@atlantictesting.com)

REF/nd

Enclosures



# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166


ATL Report No. AT1573SL-09C-12-10

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: T4-12

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	12/09/2010
Date of Test	1/6/2011
Age of Sample at Test Date	28 days
Initial Dry Density (pcf)	85.9
Initial Water Content (%)	34.3
Unconfined Compressive Strength (psi)	331.1
Average Height (in.)	5.512
Average Diameter (in.)	2.996
Height-to-Diameter Ratio	1.84
Average Rate of Strain (%/min)	0.73
Strain at Failure (%)	1.6
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 1/6/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-09C-12-10**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

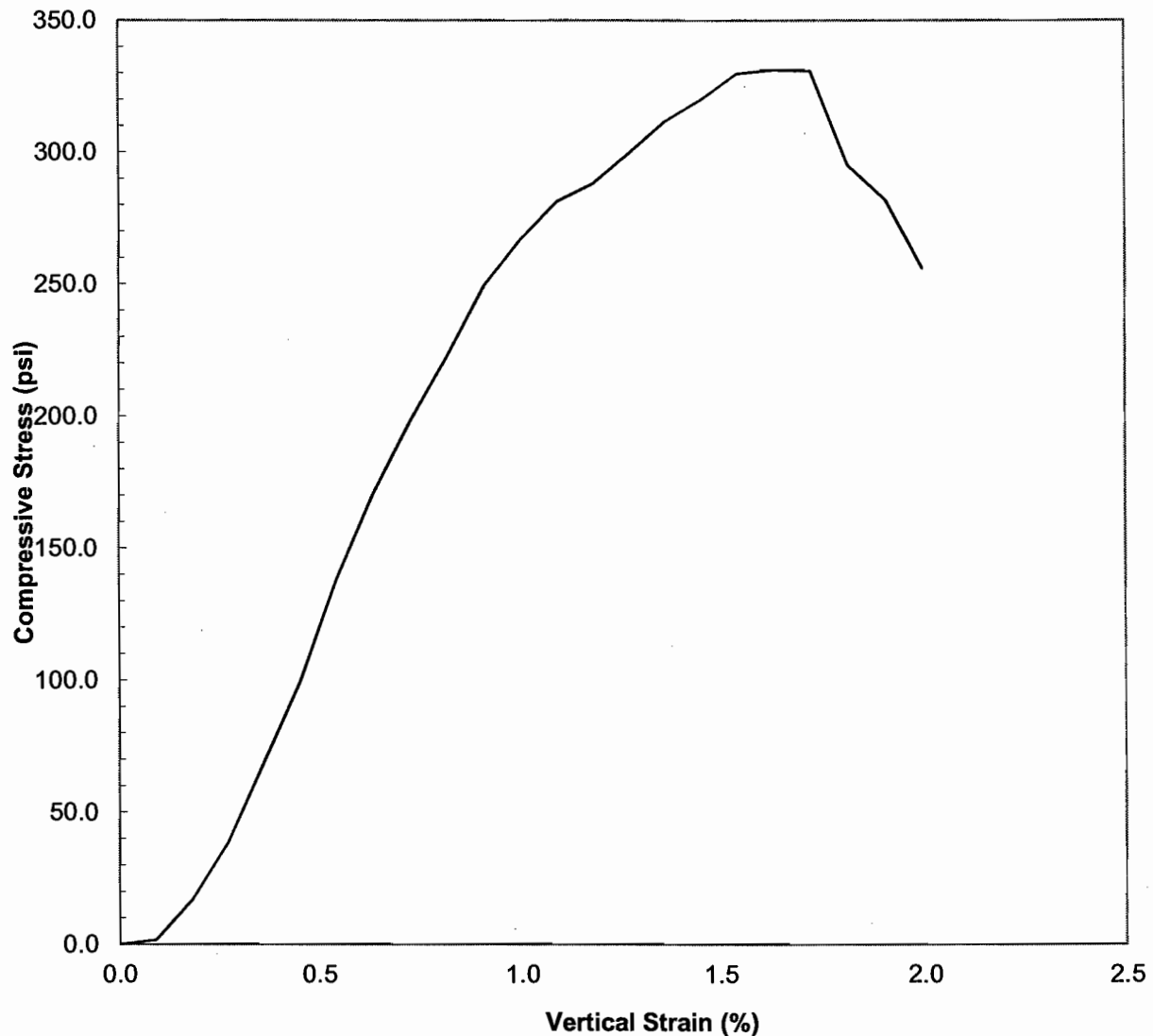
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: T4-12, 28 day**

**Depth: N/A**

**ATL Sample No. AT1573S09**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

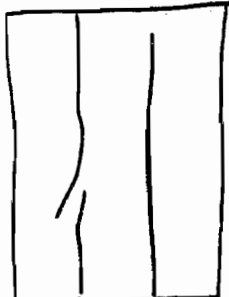
ATL Report No. AT1573SL-10C-12-10

Client: \_\_\_\_\_ AECOM

Project: \_\_\_\_\_ NGP Site, Norwich, New York

Sample ID.: \_\_\_\_\_ 5-30

Sample Description: \_\_\_\_\_ Grout Column

Parameter	Results
Date Sample Cast	12/09/2010
Date of Test	1/6/2011
Age of Sample at Test Date	28 days
Initial Dry Density (pcf)	74.4
Initial Water Content (%)	45.0
Unconfined Compressive Strength (psi)	113.5
Average Height (in.)	5.433
Average Diameter (in.)	2.996
Height-to-Diameter Ratio	1.81
Average Rate of Strain (%/min)	0.74
Strain at Failure (%)	1.6
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 1/6/11





# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-10C-12-10**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

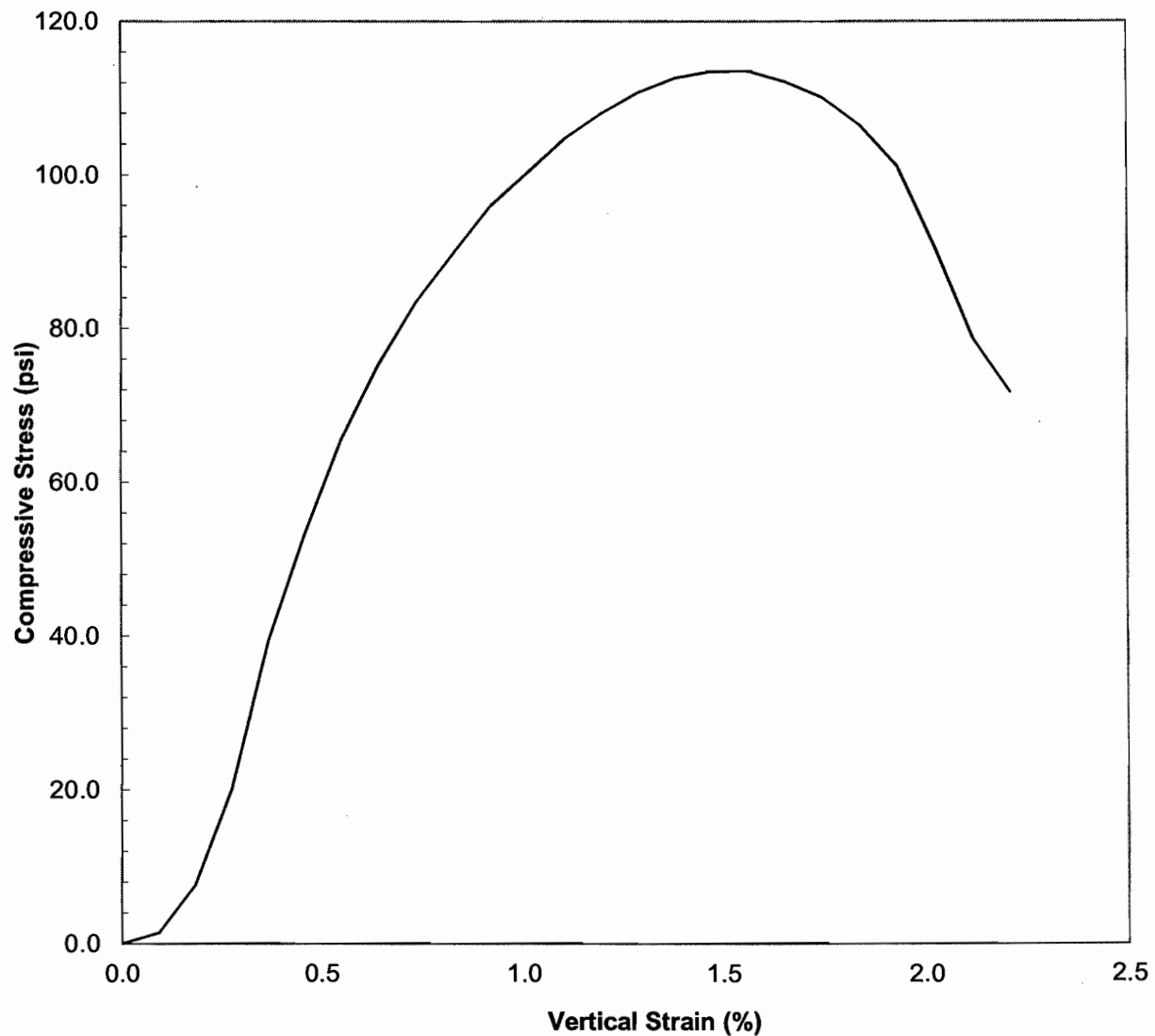
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 5-30, 28 day**

**Depth: N/A**

**ATL Sample No. AT1573S010**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166


ATL Report No. AT1573SL-11C-12-10

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: T4-9

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	12/09/2010
Date of Test	1/6/2011
Age of Sample at Test Date	28 days
Initial Dry Density (pcf)	89.5
Initial Water Content (%)	31.0
Unconfined Compressive Strength (psi)	296
Average Height (in.)	5.591
Average Diameter (in.)	3.000
Height-to-Diameter Ratio	1.86
Average Rate of Strain (%/min)	0.72
Strain at Failure (%)	1.7
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: REF

Date: 1/6/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-11C-12-10**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

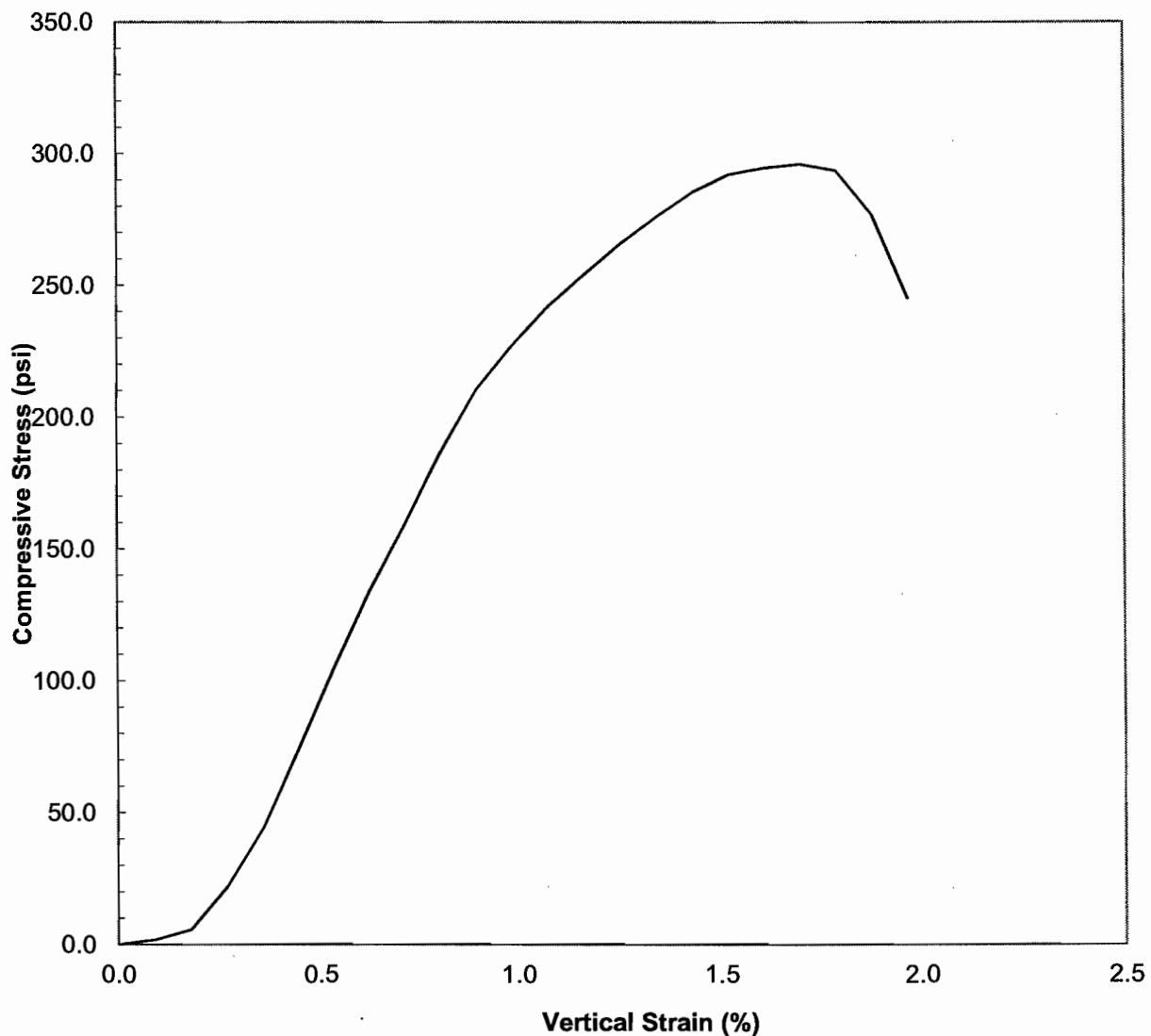
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: T4-9, 28 day**

**Depth: N/A**

**ATL Sample No. AT1573S011**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

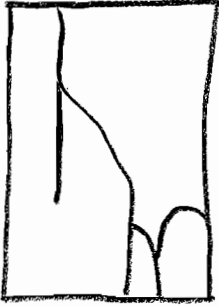
ATL Report No. AT1573SL-12C-12-10

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: T6-16

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	12/09/2010
Date of Test	1/6/2011
Age of Sample at Test Date	28 days
Initial Dry Density (pcf)	88.1
Initial Water Content (%)	31.1
Unconfined Compressive Strength (psi)	401.4
Average Height (in.)	5.748
Average Diameter (in.)	3.000
Height-to-Diameter Ratio	1.92
Average Rate of Strain (%/min)	0.70
Strain at Failure (%)	1.7
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 1/7/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-12C-12-10**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

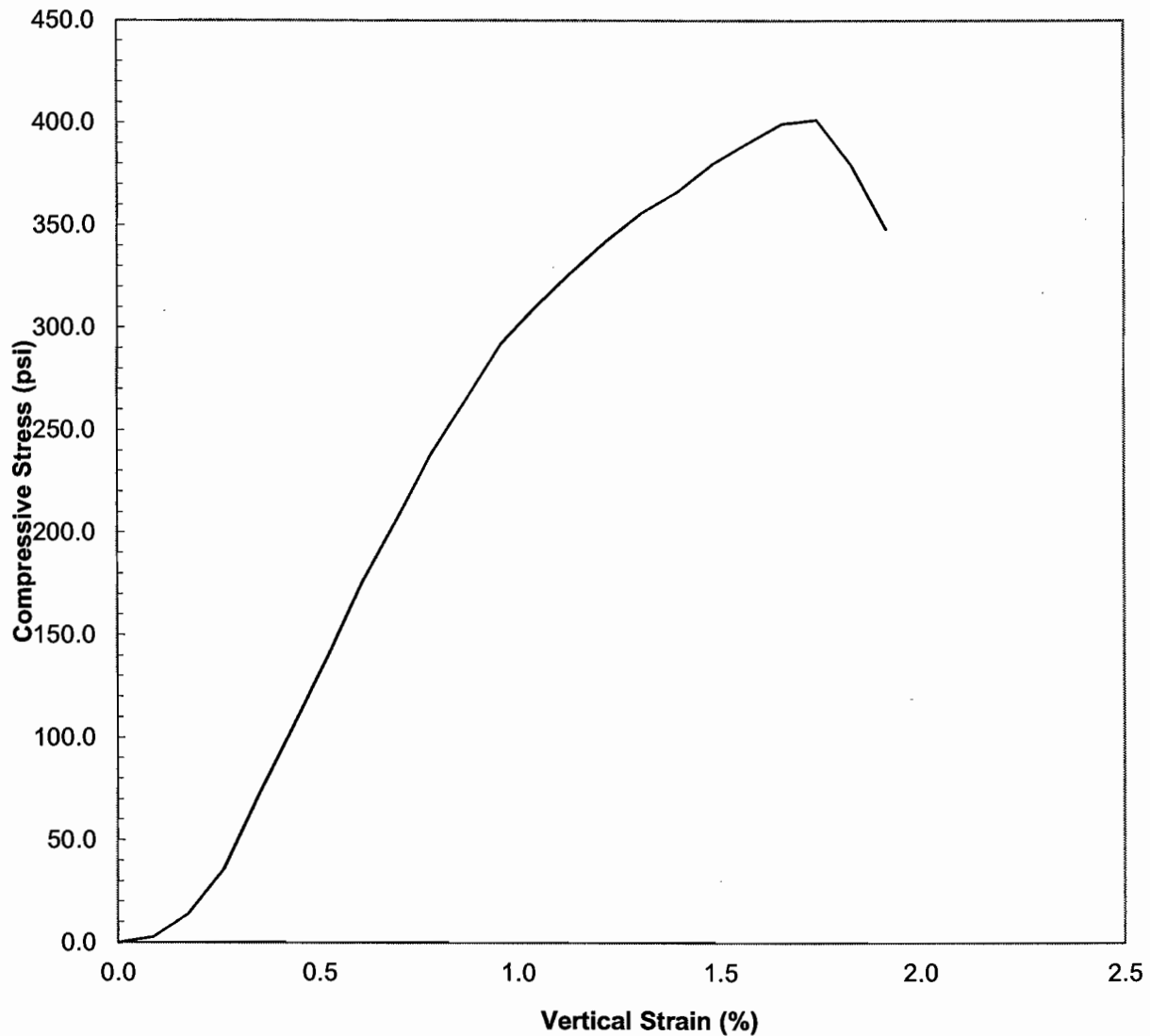
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: T6-16, 28 day**

**Depth: N/A**

**ATL Sample No. AT1573S012**





# ATLANTIC TESTING LABORATORIES

**Albany**  
22 Corporate Drive  
Clifton Park, NY 12065  
518-383-9144 (T)  
518-383-9166 (F)

## TRANSMITTAL

January 10, 2011

AECOM  
40 British American Boulevard  
Latham, New York 12110

Attn: Mr. Scott Serviss

E/Mail: [scott.serviss@aecom.com](mailto:scott.serviss@aecom.com)

Re: Soil Laboratory Testing  
NGP Site  
Norwich, New York  
ATL Project No.: AT1573

Dear Mr. Serviss:

Enclosed are the following reports:

AT1573SL-13C-12-10	Unconfined Compressive Strength	December 13, 2010
AT1573SL-10D-12-10	Hydraulic Conductivity	December 21, 2010

Please contact our office should you have any questions or if we may be of further service.

Sincerely,  
ATLANTIC TESTING LABORATORIES, Limited

Robert E. Field  
Laboratory Manager  
[bfield@atlantictesting.com](mailto:bfield@atlantictesting.com)

REF/nd

Enclosures



# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

ATL Report No. AT1573SL-13C-12-10

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 4-20

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	12/10/2010
Date of Test	1/7/2011
Age of Sample at Test Date	28 days
Initial Dry Density (pcf)	67.3
Initial Water Content (%)	54.8
Unconfined Compressive Strength (psi)	145.0
Average Height (in.)	5.433
Average Diameter (in.)	3.000
Height-to-Diameter Ratio	1.81
Average Rate of Strain (%/min)	0.74
Strain at Failure (%)	1.6
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: REF

Date: 1/10/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-13C-12-10**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

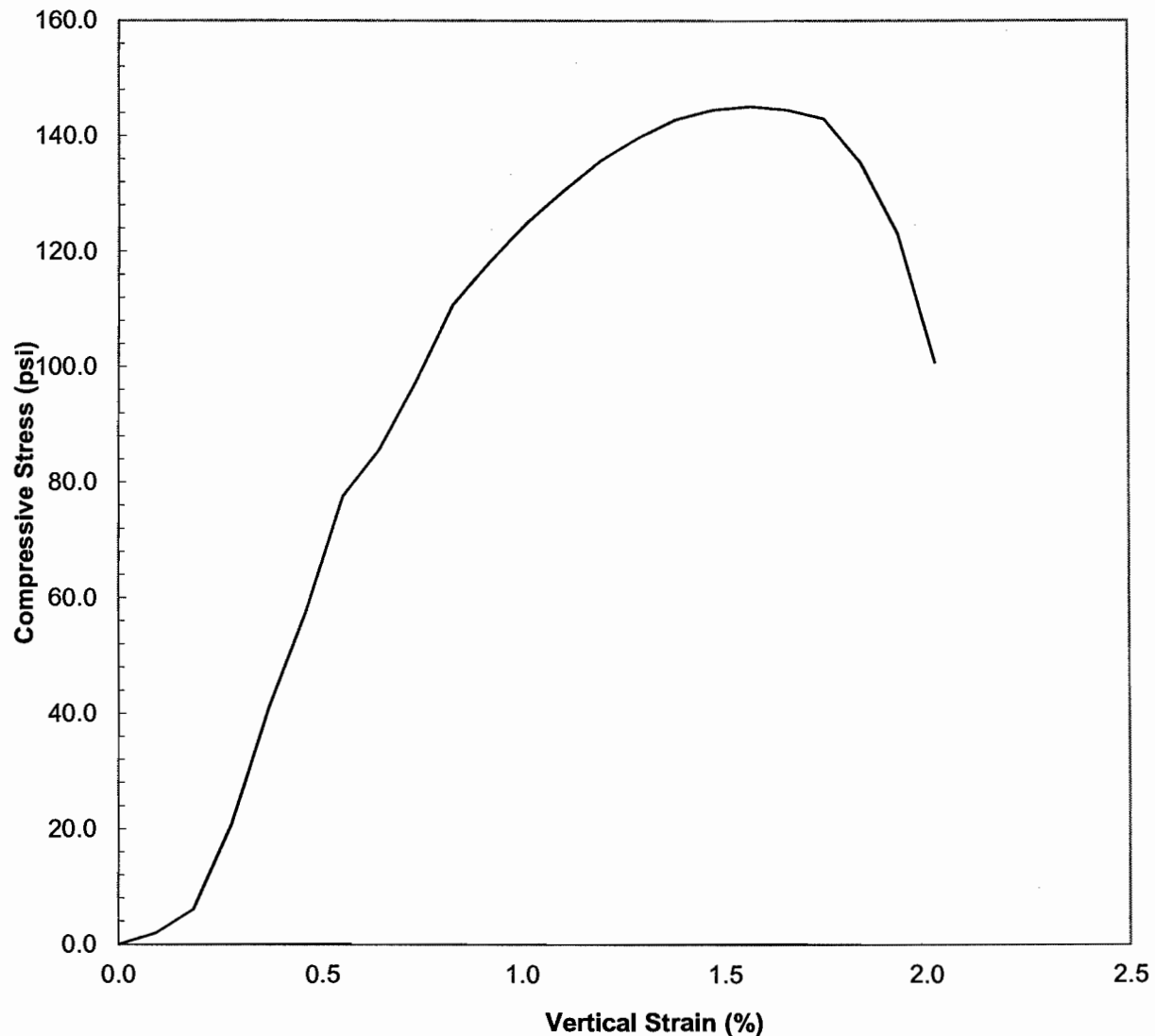
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 4-20, 28 days**

**Depth: N/A**

**ATL Sample No. AT1573S013**







# ATLANTIC TESTING LABORATORIES

**Albany**  
22 Corporate Drive  
Clifton Park, NY 12065  
518-383-9144 (T)  
518-383-9166 (F)

## TRANSMITTAL

January 11, 2011

AECOM  
40 British American Boulevard  
Latham, New York 12110

Attn: Mr. Scott Serviss

E/Mail: [scott.serviss@aecom.com](mailto:scott.serviss@aecom.com)

Re: Soil Laboratory Testing  
NGP Site  
Norwich, New York  
ATL Project No.: AT1573

Dear Mr. Serviss:

Enclosed are the following reports:

AT1573SL-14C-12-10	Unconfined Compressive Strength	December 13, 2010
AT1573SL-15C-12-10	Unconfined Compressive Strength	December 16, 2010
AT1573SL-16C-12-10	Unconfined Compressive Strength	December 16, 2010
AT1573SL-23C-12-10	Unconfined Compressive Strength	January 06, 2011
AT1573SL-18B-12-10	Hydraulic Conductivity	January 04, 2011
AT1573SL-20B-12-10	Hydraulic Conductivity	January 04, 2011
AT1573SL-21B-12-10	Hydraulic Conductivity	January 04, 2011

Please contact our office should you have any questions or if we may be of further service.

Sincerely,  
ATLANTIC TESTING LABORATORIES, Limited

Robert E. Field  
Laboratory Manager  
[bfield@atlantictesting.com](mailto:bfield@atlantictesting.com)

REF/nd

Enclosures



# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

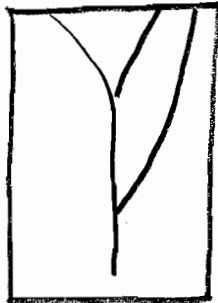
ATL Report No. AT1573SL-14C-12-10

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 5-25

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	12/11/2010
Date of Test	1/10/2011
Age of Sample at Test Date	30 days
Initial Dry Density (pcf)	66.2
Initial Water Content (%)	56.2
Unconfined Compressive Strength (psi)	149.3
Average Height (in.)	5.512
Average Diameter (in.)	3.000
Height-to-Diameter Ratio	1.84
Average Rate of Strain (%/min)	0.73
Strain at Failure (%)	1.5
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 1/11/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-14C-12-10**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

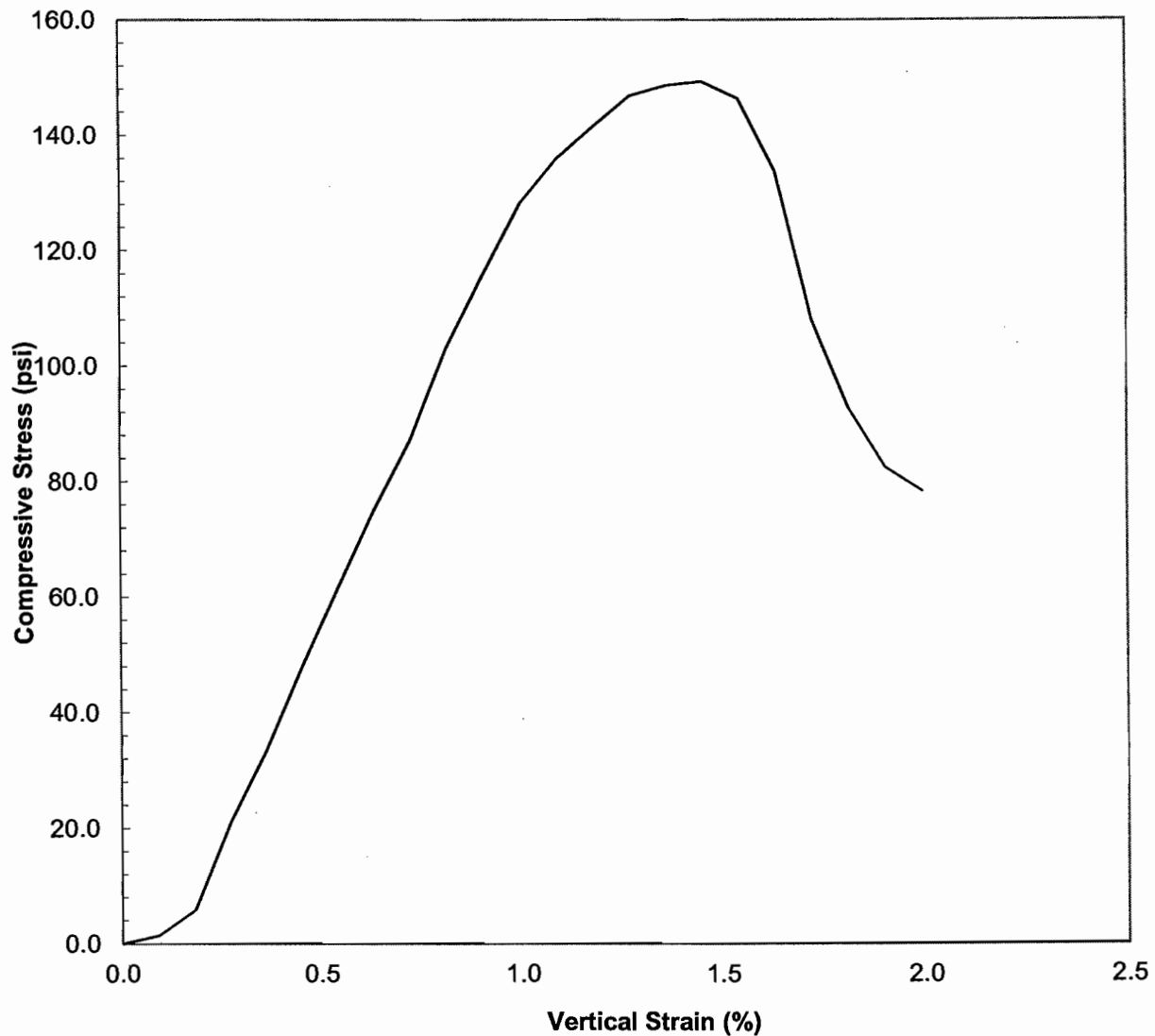
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 5-25, 30 days**

**Depth: N/A**

**ATL Sample No. AT1573S014**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

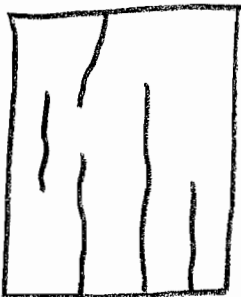
ATL Report No. AT1573SL-15C-12-10

Client: \_\_\_\_\_ AECOM

Project: \_\_\_\_\_ NGP Site, Norwich, New York

Sample ID.: \_\_\_\_\_ 5-24

Sample Description: \_\_\_\_\_ Grout Column

Parameter	Results
Date Sample Cast	12/12/2010
Date of Test	1/10/2011
Age of Sample at Test Date	29 days
Initial Dry Density (pcf)	69.4
Initial Water Content (%)	50.5
Unconfined Compressive Strength (psi)	152.2
Average Height (in.)	5.551
Average Diameter (in.)	2.997
Height-to-Diameter Ratio	1.85
Average Rate of Strain (%/min)	0.72
Strain at Failure (%)	1.7
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: QBF

Date: 1/11/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-15C-12-10**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

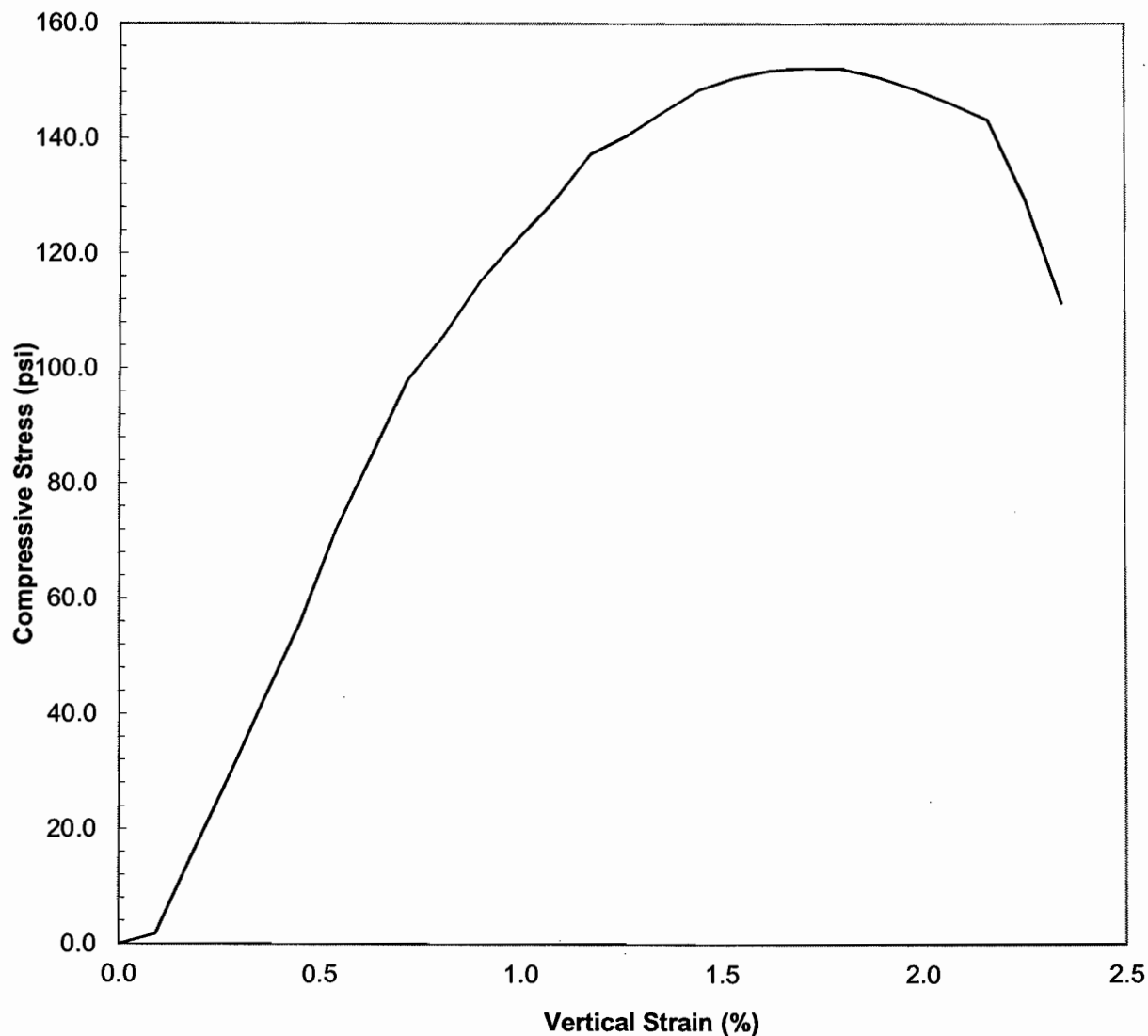
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 5-24, 29 days**

**Depth: N/A**

**ATL Sample No. AT1573S015**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

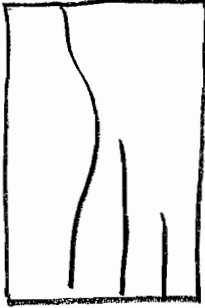
ATL Report No. AT1573SL-16B-12-10

Client: \_\_\_\_\_ AECOM

Project: \_\_\_\_\_ NGP Site, Norwich, New York

Sample ID.: \_\_\_\_\_ 15-25

Sample Description: \_\_\_\_\_ Grout Column

Parameter	Results
Date Sample Cast	12/13/2010
Date of Test	1/10/2011
Age of Sample at Test Date	28 days
Initial Dry Density (pcf)	69.4
Initial Water Content (%)	50.2
Unconfined Compressive Strength (psi)	116.1
Average Height (in.)	5.472
Average Diameter (in.)	2.996
Height-to-Diameter Ratio	1.83
Average Rate of Strain (%/min)	0.71
Strain at Failure (%)	1.6
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 1/4/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-16B-12-10**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

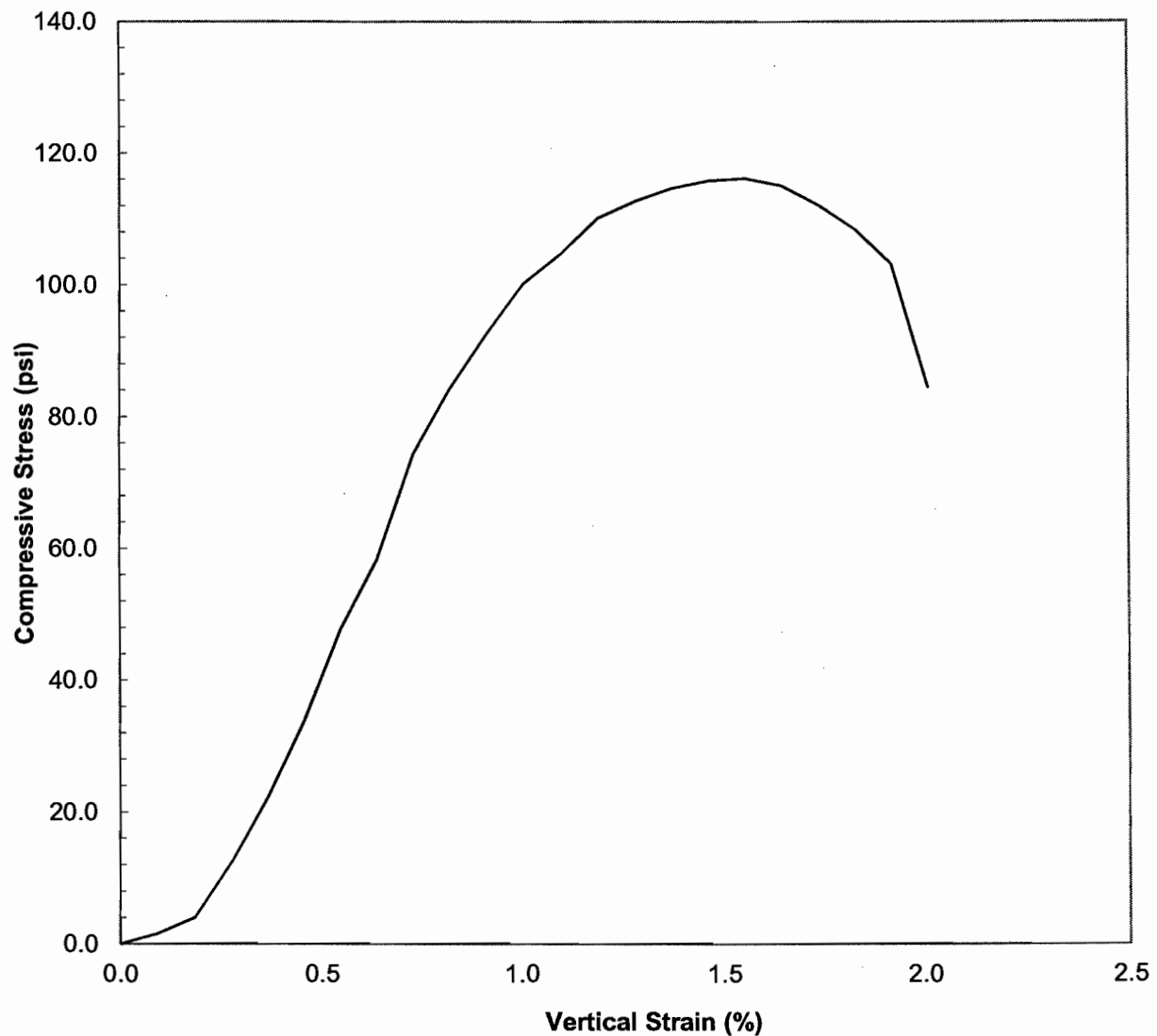
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 15-25, 28 days**

**Depth: N/A**

**ATL Sample No. AT1573S016**





# ATLANTIC TESTING LABORATORIES

**Albany**  
22 Corporate Drive  
Clifton Park, NY 12065  
518-383-9144 (T)  
518-383-9166 (F)

## TRANSMITTAL

January 12, 2011

AECOM  
40 British American Boulevard  
Latham, New York 12110

Attn: Mr. Scott Serviss

E/Mail: [scott.serviss@aecom.com](mailto:scott.serviss@aecom.com)

Re: Soil Laboratory Testing  
NGP Site  
Norwich, New York  
ATL Project No.: AT1573

Dear Mr. Serviss:

Enclosed are the following reports:

AT1573SL-17B-12-10	Unconfined Compressive Strength	December 16, 2010
AT1573SL-24-12-10	Unconfined Compressive Strength	January 06, 2011
AT1573SL-16C-12-10	Hydraulic Conductivity	January 04, 2011

Please contact our office should you have any questions or if we may be of further service.

Sincerely,  
*ATLANTIC TESTING LABORATORIES, Limited*

Robert E. Field  
Laboratory Manager  
[bfield@atlantictesting.com](mailto:bfield@atlantictesting.com)

REF/nd

Enclosures





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

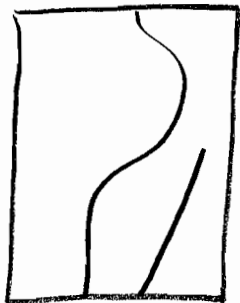
ATL Report No. AT1573SL-17B-12-10

Client: \_\_\_\_\_ AECOM

Project: \_\_\_\_\_ NGP Site, Norwich, New York

Sample ID.: \_\_\_\_\_ 17-24

Sample Description: \_\_\_\_\_ Grout Column

Parameter	Results
Date Sample Cast	12/14/2010
Date of Test	1/11/2011
Age of Sample at Test Date	28 days
Initial Dry Density (pcf)	72.1
Initial Water Content (%)	48.6
Unconfined Compressive Strength (psi)	89.5
Average Height (in.)	5.236
Average Diameter (in.)	2.983
Height-to-Diameter Ratio	1.76
Average Rate of Strain (%/min)	0.74
Strain at Failure (%)	1.9
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: RES

Date: 1/12/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-17B-12-10**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

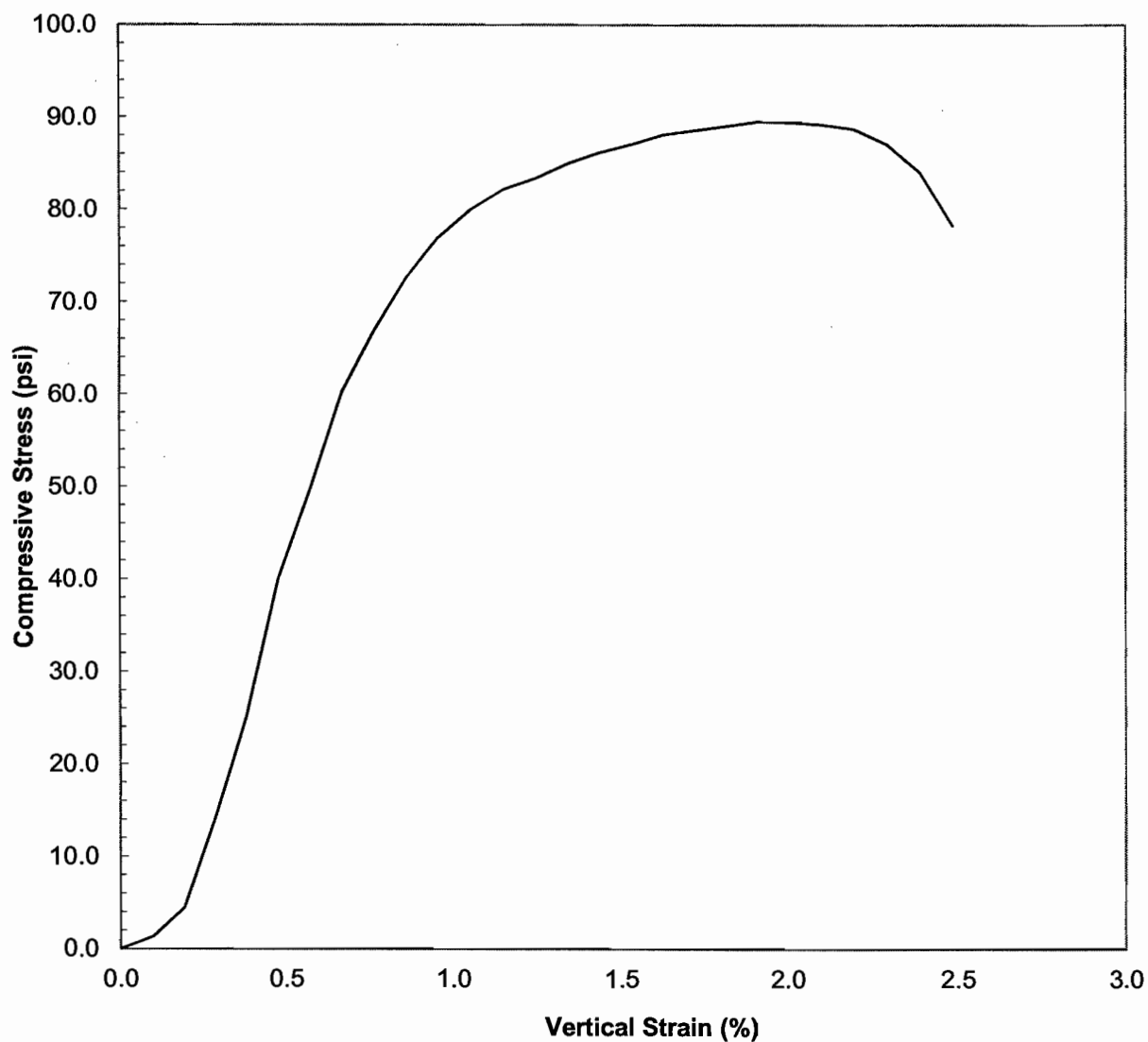
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 17-24, 28 days**

**Depth: N/A**

**ATL Sample No. AT1573S017**





# ATLANTIC TESTING LABORATORIES

**Albany**  
22 Corporate Drive  
Clifton Park, NY 12065  
518-383-9144 (T)  
518-383-9166 (F)

## TRANSMITTAL

January 13, 2011

AECOM  
40 British American Boulevard  
Latham, New York 12110

Attn: Mr. Scott Serviss

E/Mail: [scott.serviss@aecom.com](mailto:scott.serviss@aecom.com)

Re: Soil Laboratory Testing  
NGP Site  
Norwich, New York  
ATL Project No.: AT1573

Dear Mr. Serviss:

Enclosed are the following reports:

AT1573SL-18C-12-10	Unconfined Compressive Strength	December 21, 2010
AT1573SL-25-1-11	Unconfined Compressive Strength	January 11, 2011
AT1573SL-17C-12-10	Hydraulic Conductivity	January 04, 2011
AT1573SL-19B-12-10	Hydraulic Conductivity	January 04, 2011
AT1573SL-22A-12-10	Hydraulic Conductivity	January 04, 2011
AT1573SL-24A-1-11	Hydraulic Conductivity	January 06, 2011

Please contact our office should you have any questions or if we may be of further service.

Sincerely,  
ATLANTIC TESTING LABORATORIES, Limited

Robert E. Field  
Laboratory Manager  
[bfield@atlantictesting.com](mailto:bfield@atlantictesting.com)

REF/nd

Enclosures



# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

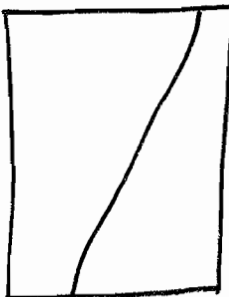
ATL Report No. AT1573SL-18C-12-10

Client: \_\_\_\_\_ AECOM

Project: \_\_\_\_\_ NGP Site, Norwich, New York

Sample ID.: \_\_\_\_\_ 17-22

Sample Description: \_\_\_\_\_ Grout Column

Parameter	Results
Date Sample Cast	12/15/2010
Date of Test	1/12/11
Age of Sample at Test Date	28 Days
Initial Dry Density (pcf)	64.2
Initial Water Content (%)	57.8
Unconfined Compressive Strength (psi)	168.5
Average Height (in.)	5.669
Average Diameter (in.)	2.984
Height-to-Diameter Ratio	1.90
Average Rate of Strain (%/min)	0.69
Strain at Failure (%)	1.4
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: \_\_\_\_\_ 

Date: 1/13/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-18C-12-10**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

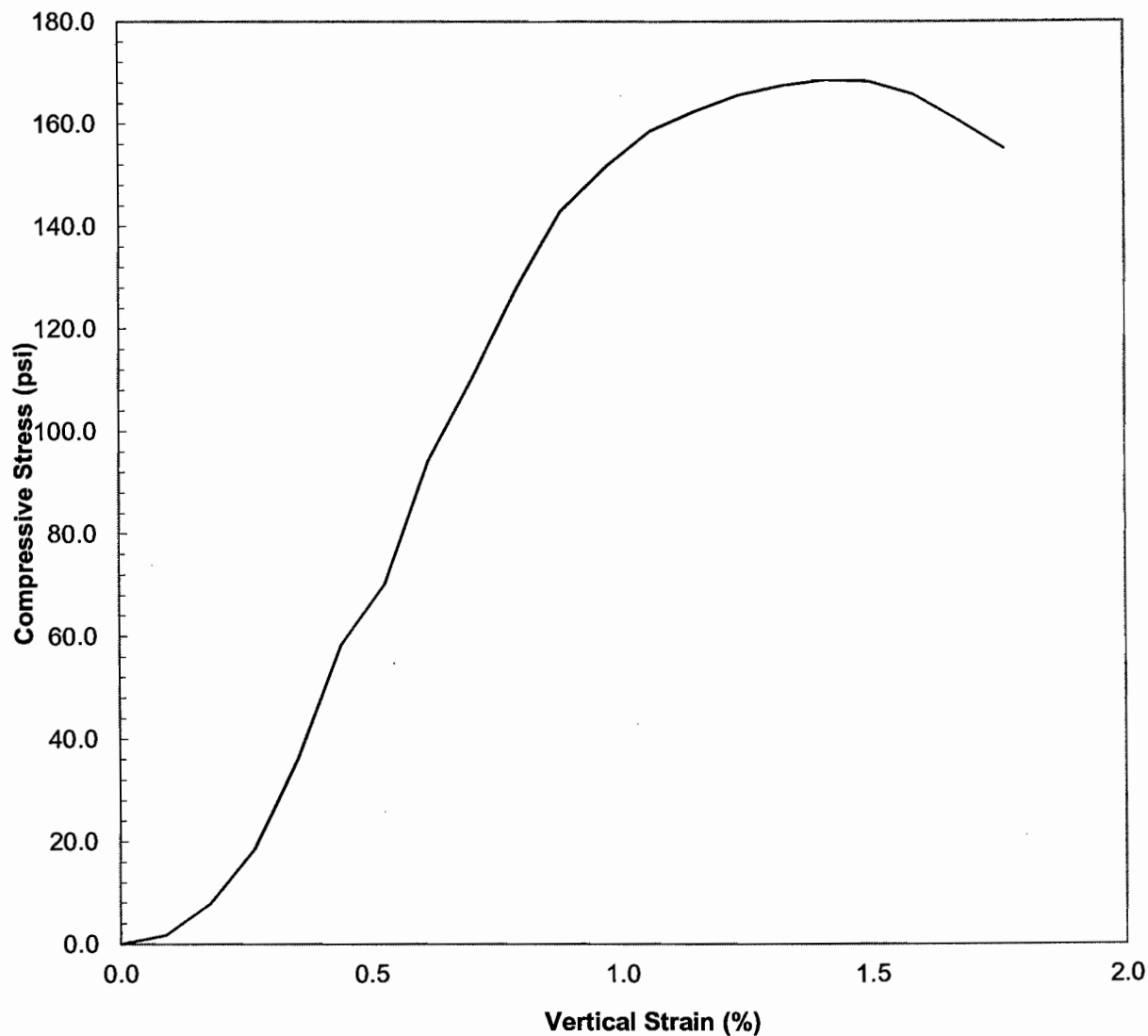
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 17-22, 28 day**

**Depth: N/A**

**ATL Sample No. AT1573S018**





# ATLANTIC TESTING LABORATORIES

**Albany**  
22 Corporate Drive  
Clifton Park, NY 12065  
518-383-9144 (T)  
518-383-9166 (F)

## TRANSMITTAL

January 14, 2011

AECOM  
40 British American Boulevard  
Latham, New York 12110

Attn: Mr. Scott Serviss

E/Mail: [scott.serviss@aecom.com](mailto:scott.serviss@aecom.com)

Re: Soil Laboratory Testing  
NGP Site  
Norwich, New York  
ATL Project No.: AT1573

Dear Mr. Serviss:

Enclosed are the following reports:

AT1573SL-19C-12-10	Unconfined Compressive Strength	January 4, 2011
AT1573SL-26-1-11	Unconfined Compressive Strength	January 11, 2011

Please contact our office should you have any questions or if we may be of further service.

Sincerely,  
ATLANTIC TESTING LABORATORIES, Limited

Robert E. Field  
Laboratory Manager  
[bfield@atlantictesting.com](mailto:bfield@atlantictesting.com)

REF/nd

Enclosures



# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166


ATL Report No. AT1573SL-19C-12-10

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 21-21

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	12/16/2010
Date of Test	1/13/2011
Age of Sample at Test Date	28 Days
Initial Dry Density (pcf)	70.2
Initial Water Content (%)	49.8
Unconfined Compressive Strength (psi)	123.8
Average Height (in.)	5.551
Average Diameter (in.)	2.995
Height-to-Diameter Ratio	1.85
Average Rate of Strain (%/min)	0.67
Strain at Failure (%)	1.6
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 1/14/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-19C-12-10**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

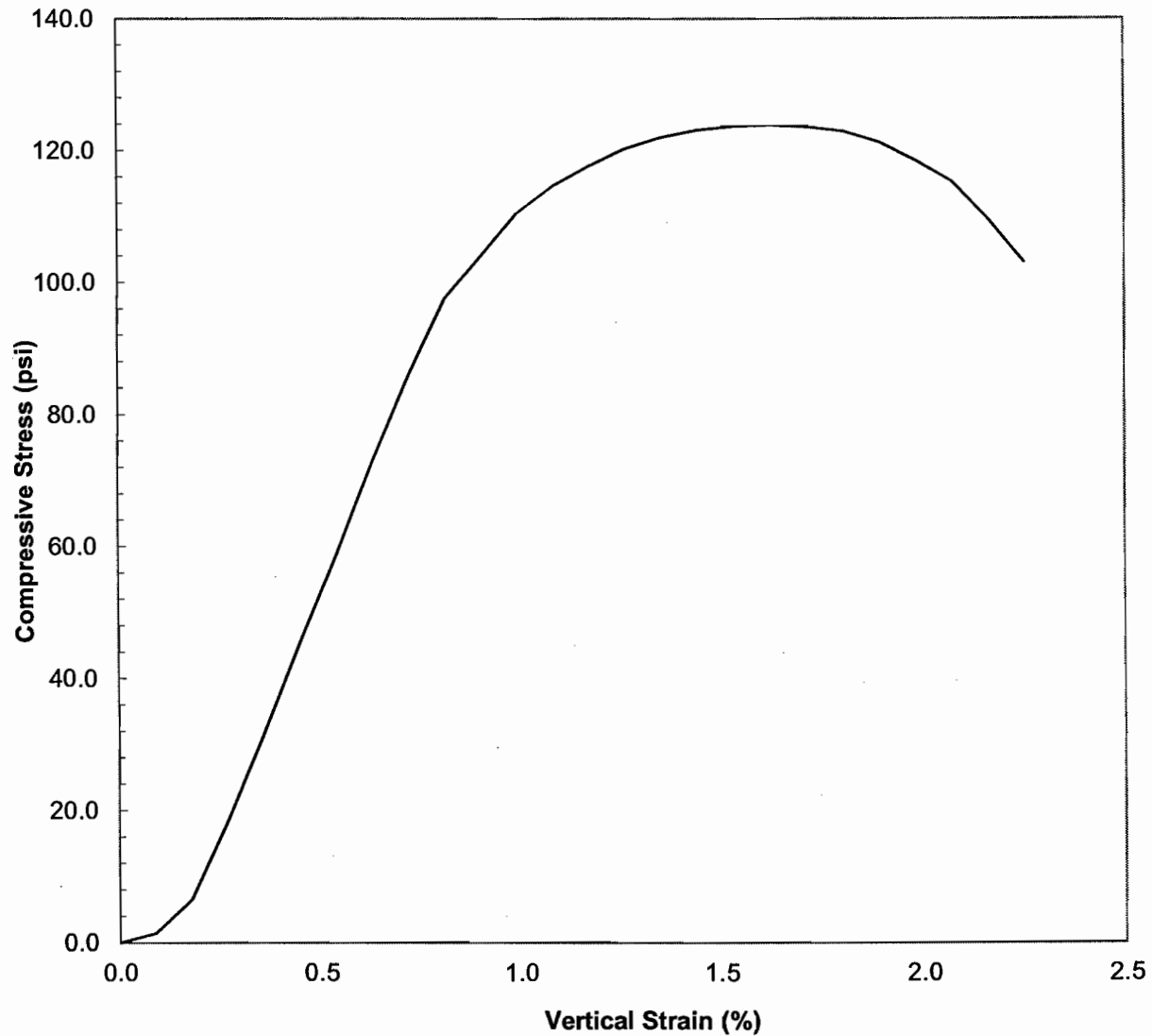
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 21-21, 28 days**

**Depth: N/A**

**ATL Sample No. AT1573S019**







# ATLANTIC TESTING LABORATORIES

**Albany**  
22 Corporate Drive  
Clifton Park, NY 12065  
518-383-9144 (T)  
518-383-9166 (F)

## TRANSMITTAL

January 17, 2011

AECOM  
40 British American Boulevard  
Latham, New York 12110

Attn: Mr. Scott Serviss

E/Mail: [scott.serviss@aecom.com](mailto:scott.serviss@aecom.com)

Re: Soil Laboratory Testing  
NGP Site  
Norwich, New York  
ATL Project No.: AT1573

Dear Mr. Serviss:

Enclosed are the following reports:

AT1573SL-20C-12-10	Unconfined Compressive Strength	December 21, 2010
AT1573SL-27-1-11	Unconfined Compressive Strength	January 11, 2011
AT1573SL-28-1-11	Unconfined Compressive Strength	January 11, 2011
AT1573SL-25A-1-11	Hydraulic Conductivity	January 11, 2011
AT1573SL-26A-1-11	Hydraulic Conductivity	January 11, 2011

Please contact our office should you have any questions or if we may be of further service.

Sincerely,  
ATLANTIC TESTING LABORATORIES, Limited

Robert E. Field  
Laboratory Manager  
[bfield@atlantictesting.com](mailto:bfield@atlantictesting.com)

REF/nd

Enclosures



# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

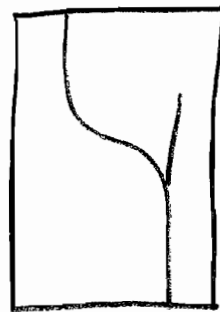
ATL Report No. AT1573SL-20C-12-10

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 24-19

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	12/17/2010
Date of Test	1/14/2011
Age of Sample at Test Date	28 Days
Initial Dry Density (pcf)	68.4
Initial Water Content (%)	53.2
Unconfined Compressive Strength (psi)	118.7
Average Height (in.)	5.394
Average Diameter (in.)	2.992
Height-to-Diameter Ratio	1.8
Average Rate of Strain (%/min)	0.69
Strain at Failure (%)	1.4
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 1/17/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-20C-12-10**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

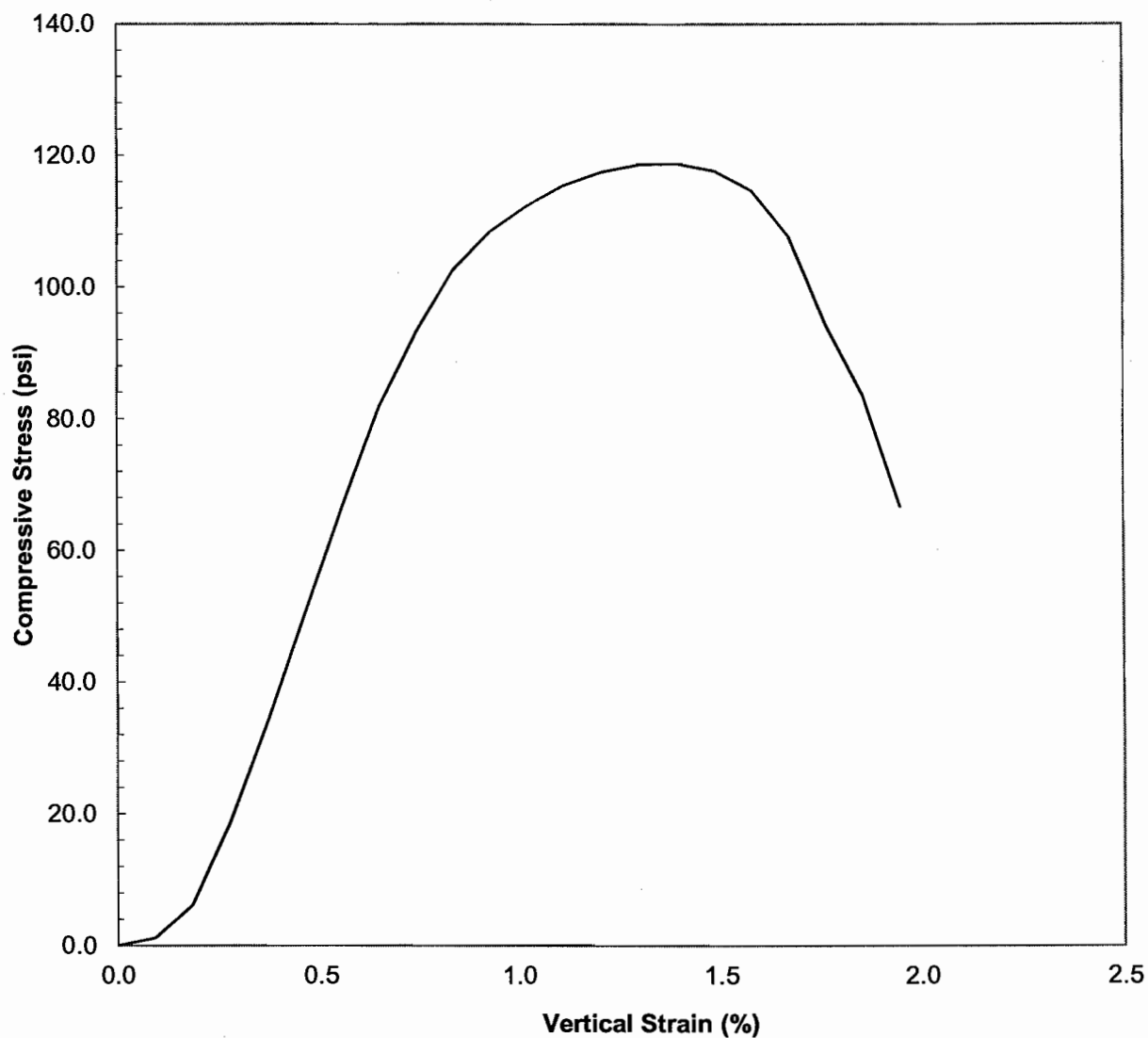
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 24-19, 28 day**

**Depth: N/A**

**ATL Sample No. AT1573S020**





# ATLANTIC TESTING LABORATORIES

**Albany**  
22 Corporate Drive  
Clifton Park, NY 12065  
518-383-9144 (T)  
518-383-9166 (F)

## TRANSMITTAL

January 18, 2011

AECOM  
40 British American Boulevard  
Latham, New York 12110

Attn: Mr. Scott Serviss

E/Mail: [scott.serviss@aecom.com](mailto:scott.serviss@aecom.com)

Re: Soil Laboratory Testing  
NGP Site  
Norwich, New York  
ATL Project No.: AT1573

Dear Mr. Serviss:

Enclosed are the following reports:

AT1573SL-21C-12-10	Unconfined Compressive Strength	December 21, 2010
AT1573SL-22B-12-10	Unconfined Compressive Strength	January 04, 2011
AT1573SL-23A-12-10	Unconfined Compressive Strength	January 06, 2011
AT1573SL-29-1-11	Unconfined Compressive Strength	January 11, 2011
AT1573SL-30-1-11	Unconfined Compressive Strength	January 13, 2011

Please contact our office should you have any questions or if we may be of further service.

Sincerely,  
ATLANTIC TESTING LABORATORIES, Limited

Robert E. Field  
Laboratory Manager  
[bfield@atlantictesting.com](mailto:bfield@atlantictesting.com)

REF/nd

Enclosures



# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

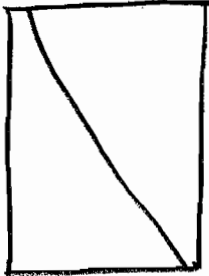
ATL Report No. AT1573SL-21C-12-10

Client: AECOM

Project: NGP Site, Norwich, New York

Sample ID.: 24-17

Sample Description: Grout Column

Parameter	Results
Date Sample Cast	12/18/2010
Date of Test	1/17/2011
Age of Sample at Test Date	30 Days
Initial Dry Density (pcf)	66.7
Initial Water Content (%)	54.6
Unconfined Compressive Strength (psi)	157.9
Average Height (in.)	5.472
Average Diameter (in.)	2.995
Height-to-Diameter Ratio	1.83
Average Rate of Strain (%/min)	0.69
Strain at Failure (%)	1.4
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by: 

Date: 1/18/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-21C-12-10**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

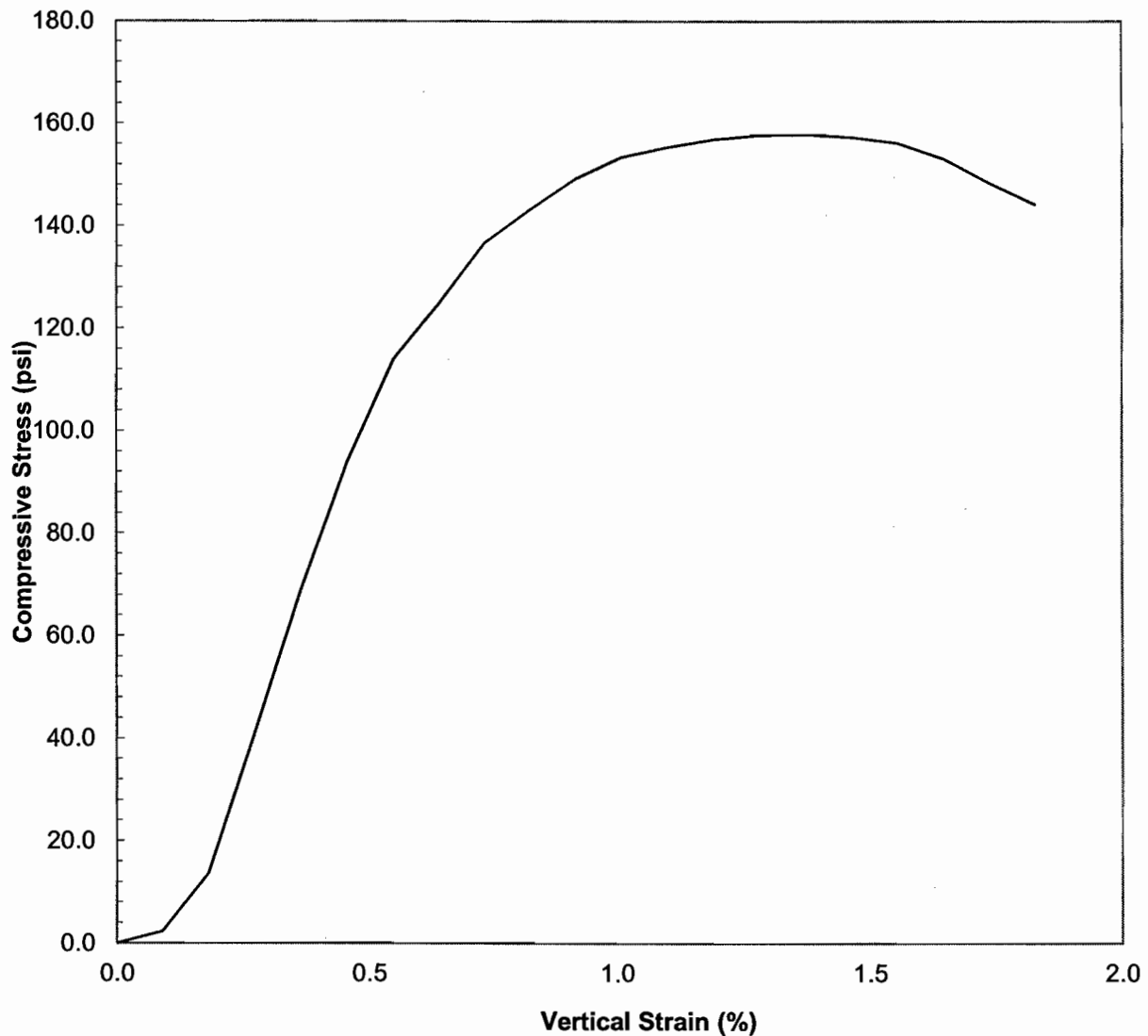
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 24-17, 30 days**

**Depth: N/A**

**ATL Sample No. AT1573S021**





# ATLANTIC TESTING LABORATORIES

## Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166


ATL Report No. AT1573SL-22B-12-10

Client: \_\_\_\_\_ AECOM

Project: \_\_\_\_\_ NGP Site, Norwich, New York

Sample ID.: \_\_\_\_\_ 29-15

Sample Description: \_\_\_\_\_ Grout Column

Parameter	Results
Date Sample Cast	12/20/2010
Date of Test	1/17/2011
Age of Sample at Test Date	28 Days
Initial Dry Density (pcf)	65.0
Initial Water Content (%)	54.8
Unconfined Compressive Strength (psi)	134.7
Average Height (in.)	5.472
Average Diameter (in.)	3.001
Height-to-Diameter Ratio	1.82
Average Rate of Strain (%/min)	0.68
Strain at Failure (%)	1.5
Sketch at Failure	

Remarks: The sample did not meet the minimum Height to Diameter Ratio of 2 to 2.5.

Reviewed by:  \_\_\_\_\_

Date: 1/18/11



# ATLANTIC TESTING LABORATORIES

**ATL Report No. AT1573SL-22B-12-10**

**AECOM**

**NGP Site, Norwich, New York**

**Unconfined Compressive Strength of Cohesive Soil**

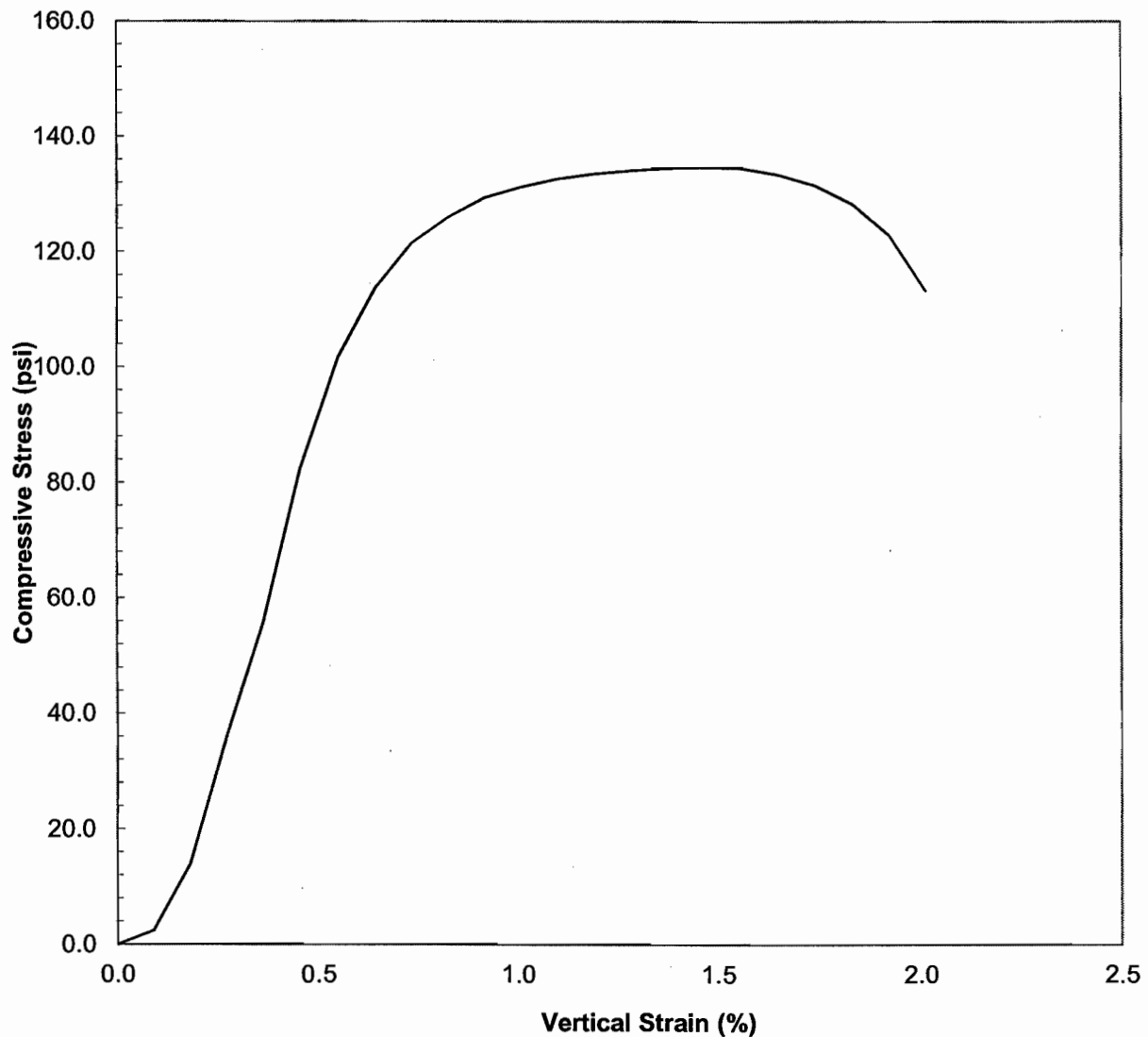
**ASTM D 2166**

**Stress-Strain Graph**

**Sample ID: 29-15, 28 day**

**Depth: N/A**

**ATL Sample No. AT1573S022**







# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-01A-12-10

ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE: 12/16/10  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 12/13/10

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S01A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 14-26 Cast 12/2/10  
Sample Type: 3x6 cylinder

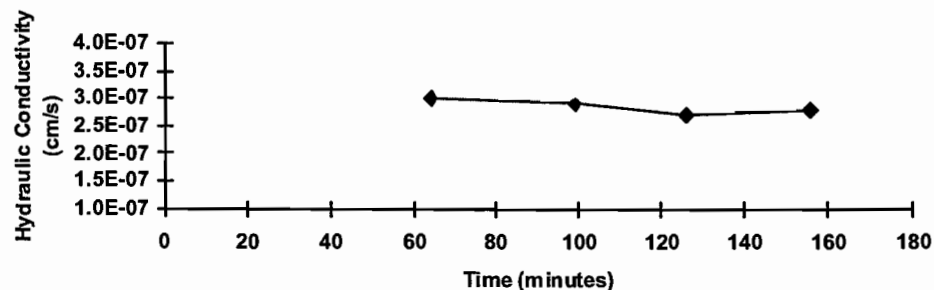
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	2.360	Weight (lbs):	2.388	Permeant Liquid:	Water
Sample Length (in):	5.512	Sample Length (in):	5.512	Test Method:	C
Sample Diameter (in):	2.992	Sample Diameter (in):	2.992	Saturation (%):	96
Area (in <sup>2</sup> ):	7.031	Area (in <sup>2</sup> ):	7.031	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	38.75	Volume (in <sup>3</sup> ):	38.75	Optimum Moisture Content (%):	N/A
Moisture Content (%):	50.7	Moisture Content (%):	52.4		
Dry Unit Weight (pcf):	69.9	Dry Unit Weight (pcf):	69.9		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
66	55	57	9	11	2	$2.9 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 12 days when it was set up in the permeability cell.

Reviewed by:

Date: 12/16/10



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-02A-12-10

ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE: 12/15/10  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 12/7/10

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S02A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 14-27 Cast 12/2/10  
Sample Type: 3x6 cylinder

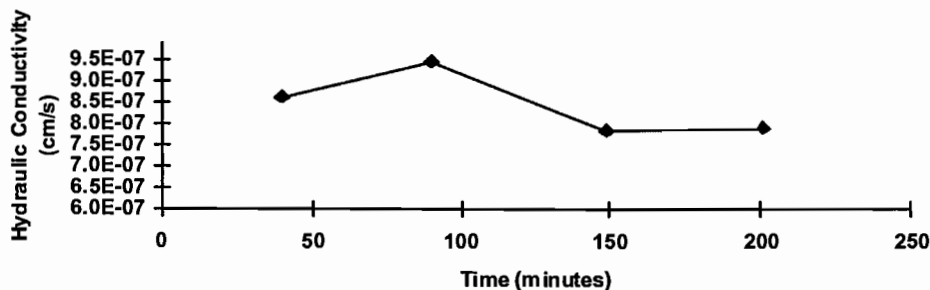
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	2.219	Weight (lbs):	2.251	Permeant Liquid:	Water
Sample Length (in):	5.236	Sample Length (in):	5.236	Test Method:	C
Sample Diameter (in):	3.000	Sample Diameter (in):	3.000	Saturation (%):	96
Area (in <sup>2</sup> ):	7.069	Area (in <sup>2</sup> ):	7.069	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	37.01	Volume (in <sup>3</sup> ):	37.01	Optimum Moisture Content (%):	N/A
Moisture Content (%):	50.9	Moisture Content (%):	52.9		
Dry Unit Weight (pcf):	68.7	Dry Unit Weight (pcf):	68.7		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
66	55	57	9	11	2	$8.5 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 7 days when it was set up in the permeability cell.

Reviewed by:

Date:

12/15/10



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-03A-12-10

ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE: 12/16/10  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 12/13/10

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S03A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 14-28 Cast 12/3/10  
Sample Type: 3x6 cylinder

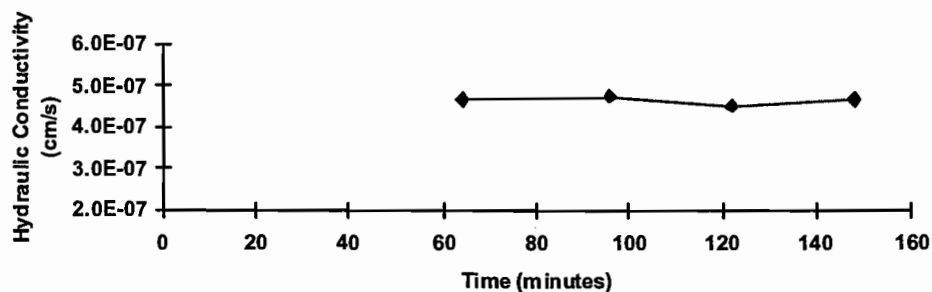
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	2.221	Weight (lbs):	2.257	Permeant Liquid:	Water
Sample Length (in):	5.276	Sample Length (in):	5.276	Test Method:	C
Sample Diameter (in):	3.008	Sample Diameter (in):	3.008	Saturation (%):	96
Area (in <sup>2</sup> ):	7.106	Area (in <sup>2</sup> ):	7.106	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	37.49	Volume (in <sup>3</sup> ):	37.49	Optimum Moisture Content (%):	N/A
Moisture Content (%):	50.7	Moisture Content (%):	53.1		
Dry Unit Weight (pcf):	67.9	Dry Unit Weight (pcf):	67.9		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
66	55	57	9	11	2	$4.7 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 11 days when it was set up in the permeability cell.

Reviewed by:

Date:

12/16/10



# ATLANTIC TESTING LABORATORIES

## Albany

22 Corporate Drive  
Clifton Park, NY 12065  
518-383-9144 (T)  
518-383-9166 (F)

## TRANSMITTAL

December 29, 2010

AECOM  
40 British American Boulevard  
Latham, New York 12110

Attn: Mr. Scott Serviss

E/Mail: [scott.serviss@aecom.com](mailto:scott.serviss@aecom.com)

Re: Soil Laboratory Testing  
NGP Site  
Norwich, New York  
ATL Project No.: AT1573

Dear Mr. Serviss:

Enclosed are the following reports:

AT1573SL-04B-12-10	Hydraulic Conductivity	December 07, 2010
AT1573SL-05B-12-10	Hydraulic Conductivity	December 10, 2010
AT1573SL-17A-12-10	Unconfined Compressive Strength	December 16, 2010

Please contact our office should you have any questions or if we may be of further service.

Sincerely,

ATLANTIC TESTING LABORATORIES, Limited

Robert E. Field  
Laboratory Manager  
[bfield@atlantictesting.com](mailto:bfield@atlantictesting.com)

REF/nd

Enclosures



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-4B-12-10 ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE : 12/29/10  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 12/07/10

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S4B  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 13-30 Cast 12/4/10  
Sample Type: 3x6 cylinder

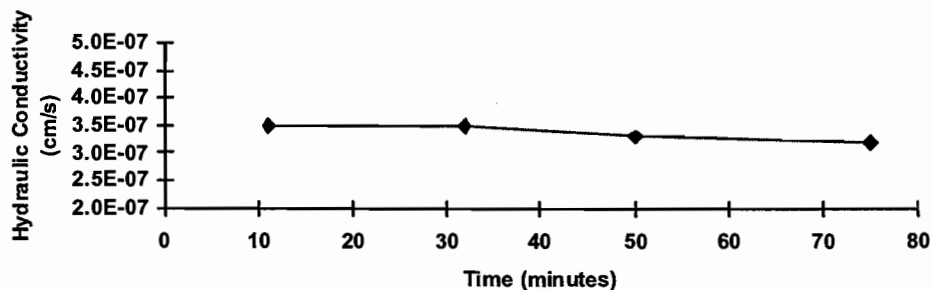
### SAMPLE INFORMATION

INITIAL	FINAL	PARAMETERS
Weight (lbs): 2.292	Weight (lbs): 2.314	Permeant Liquid: Water
Sample Length (in): 5.315	Sample Length (in): 5.315	Test Method: C
Sample Diameter (in): 3.000	Sample Diameter (in): 3.000	Saturation (%): 96
Area (in <sup>2</sup> ): 7.069	Area (in <sup>2</sup> ): 7.069	Maximum Dry Density (pcf): N/A
Volume (in <sup>3</sup> ): 37.57	Volume (in <sup>3</sup> ): 37.57	Optimum Moisture Content (%): N/A
Moisture Content (%): 51.7	Moisture Content (%): 53.2	
Dry Unit Weight (pcf): 69.5	Dry Unit Weight (pcf): 69.5	

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$3.4 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 16 days when it was set up in the permeability cell.

Reviewed by:

Date:

12/29/10



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-5B-12-10

ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE : 12/29/10  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 12/10/10

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S5B  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 12-30 Cast 12/6/10  
Sample Type: 3x6 cylinder

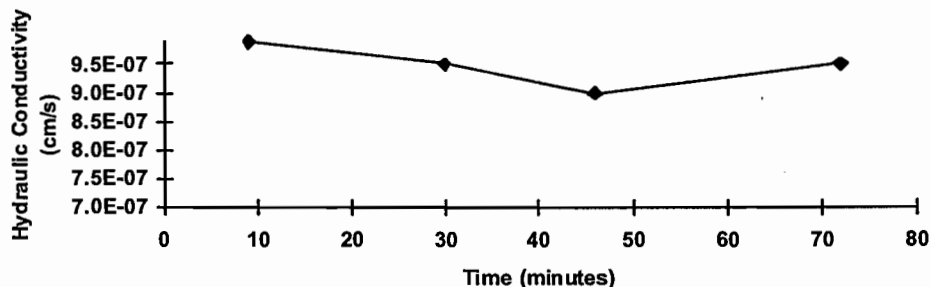
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	2.196	Weight (lbs):	2.218	Permeant Liquid:	Water
Sample Length (in):	5.197	Sample Length (in):	5.197	Test Method:	C
Sample Diameter (in):	3.004	Sample Diameter (in):	3.004	Saturation (%):	96
Area (in <sup>2</sup> ):	7.087	Area (in <sup>2</sup> ):	7.087	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	36.83	Volume (in <sup>3</sup> ):	36.83	Optimum Moisture Content (%):	N/A
Moisture Content (%):	54.3	Moisture Content (%):	55.8		
Dry Unit Weight (pcf):	66.8	Dry Unit Weight (pcf):	66.8		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	9.5 x 10 <sup>-7</sup>

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 14 days when it was set up in the permeability cell.

Reviewed by:

Date:

12/29/10



# ATLANTIC TESTING LABORATORIES

## Albany

22 Corporate Drive  
Clifton Park, NY 12065  
518-383-9144 (T)  
518-383-9166 (F)

## TRANSMITTAL

December 21, 2010

AECOM  
40 British American Boulevard  
Latham, New York 12110

Attn: Mr. Scott Serviss

E/Mail: [scott.serviss@aecom.com](mailto:scott.serviss@aecom.com)

Re: Soil Laboratory Testing  
NGP Site  
Norwich, New York  
ATL Project No.: AT1573

Dear Mr. Serviss:

Enclosed are the following reports:

AT1573SL-05A-12-10	Unconfined Compressive Strength	December 10, 2010
AT1573SL-07A-12-10	Hydraulic Conductivity	December 10, 2010
AT1573SL-09A-12-10	Hydraulic Conductivity	December 13, 2010
AT1573SL-11A-12-10	Hydraulic Conductivity	December 13, 2010
AT1573SL-15-12-10	Hydraulic Conductivity	December 13, 2010
AT1573SL-16-12-10	Unconfined Compressive Strength	December 16, 2010

Please contact our office should you have any questions or if we may be of further service.

Sincerely,  
ATLANTIC TESTING LABORATORIES, Limited

Robert E. Field  
Laboratory Manager  
[bfield@atlantictesting.com](mailto:bfield@atlantictesting.com)

REF/nd

Enclosures



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-07A-12-10

ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE: 12/21/10  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 12/10/10

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S07A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: T6-20 Cast 12/8/10  
Sample Type: 3x6 cylinder

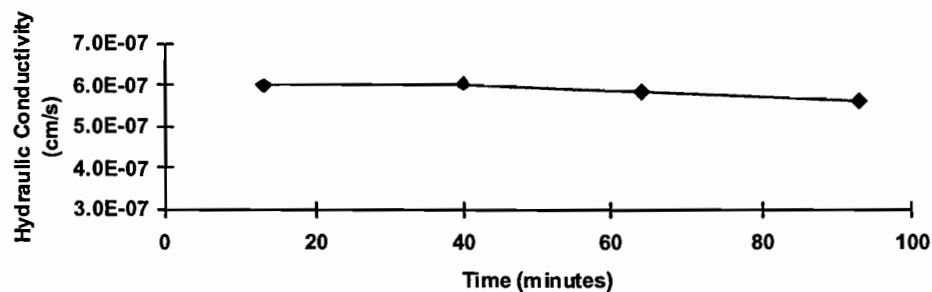
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	2.582	Weight (lbs):	2.614	Permeant Liquid:	Water
Sample Length (in):	5.629	Sample Length (in):	5.629	Test Method:	C
Sample Diameter (in):	3.004	Sample Diameter (in):	3.004	Saturation (%):	96
Area (in <sup>2</sup> ):	7.087	Area (in <sup>2</sup> ):	7.087	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	39.89	Volume (in <sup>3</sup> ):	39.89	Optimum Moisture Content (%):	N/A
Moisture Content (%):	37.9	Moisture Content (%):	39.6		
Dry Unit Weight (pcf):	81.1	Dry Unit Weight (pcf):	81.1		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$5.9 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 7 days when it was set up in the permeability cell.

Reviewed by:

Date:

12/21/10





# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-09A-12-10

ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE: 12/21/10  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 12/13/10

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S09A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: T4-12 Cast 12/9/10  
Sample Type: 3x6 cylinder

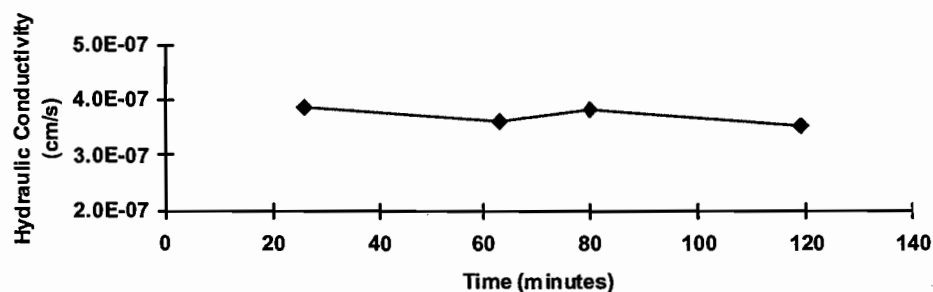
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	2.585	Weight (lbs):	2.607	Permeant Liquid:	Water
Sample Length (in):	5.512	Sample Length (in):	5.512	Test Method:	C
Sample Diameter (in):	3.008	Sample Diameter (in):	3.008	Saturation (%):	96
Area (in <sup>2</sup> ):	7.106	Area (in <sup>2</sup> ):	7.106	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	39.17	Volume (in <sup>3</sup> ):	39.17	Optimum Moisture Content (%):	N/A
Moisture Content (%):	33.4	Moisture Content (%):	34.6		
Dry Unit Weight (pcf):	85.5	Dry Unit Weight (pcf):	85.4		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
56	45	47	9	11	2	$3.7 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 7 days when it was set up in the permeability cell.

Reviewed by:

Date:

12/21/10



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-11A-12-10

ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE: 12/21/10  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 12/13/10

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S11A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: T4-9 Cast 12/9/10  
Sample Type: 3x6 cylinder

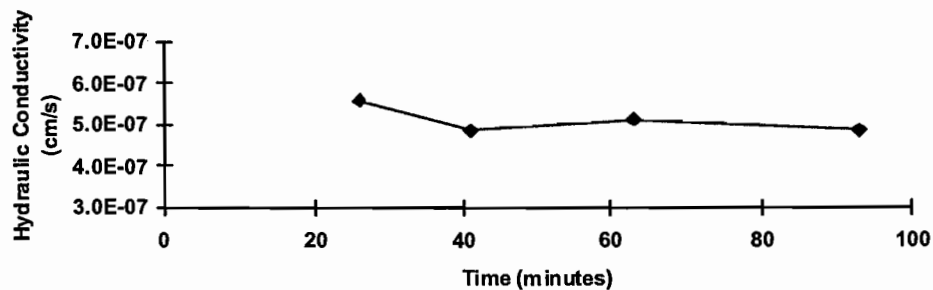
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	2.588	Weight (lbs):	2.621	Permeant Liquid:	Water
Sample Length (in):	5.512	Sample Length (in):	5.512	Test Method:	C
Sample Diameter (in):	3.000	Sample Diameter (in):	3.000	Saturation (%):	96
Area (in <sup>2</sup> ):	7.069	Area (in <sup>2</sup> ):	7.069	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	38.96	Volume (in <sup>3</sup> ):	38.96	Optimum Moisture Content (%):	N/A
Moisture Content (%):	33.3	Moisture Content (%):	34.9		
Dry Unit Weight (pcf):	86.1	Dry Unit Weight (pcf):	86.2		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
56	45	47	9	11	2	$5.1 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 7 days when it was set up in the permeability cell.

Reviewed by: \_\_\_\_\_

Date: \_\_\_\_\_

12/21/10



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-12A-12-10

ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE: 12/21/10  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 12/13/10

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S12A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: T6-16 Cast 12/9/10  
Sample Type: 3x6 cylinder

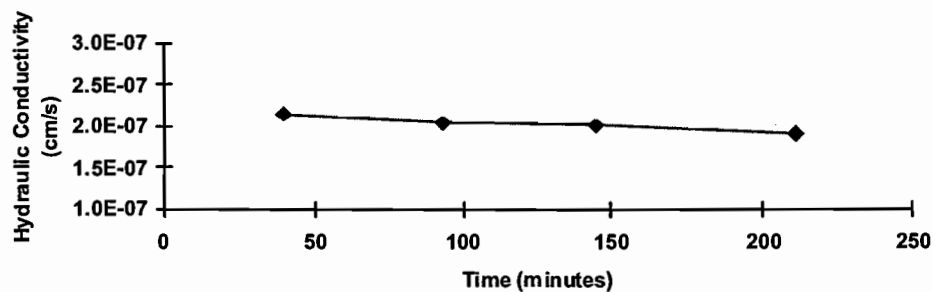
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	2.699	Weight (lbs):	2.734	Permeant Liquid:	Water
Sample Length (in):	5.669	Sample Length (in):	5.669	Test Method:	C
Sample Diameter (in):	3.004	Sample Diameter (in):	3.004	Saturation (%):	96
Area (in <sup>2</sup> ):	7.087	Area (in <sup>2</sup> ):	7.087	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	40.17	Volume (in <sup>3</sup> ):	40.17	Optimum Moisture Content (%):	N/A
Moisture Content (%):	31.1	Moisture Content (%):	32.8		
Dry Unit Weight (pcf):	88.6	Dry Unit Weight (pcf):	88.6		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
56	45	47	9	11	2	$2.0 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 7 days when it was set up in the permeability cell.

Reviewed by:

Date:

12/21/10



# ATLANTIC TESTING LABORATORIES

**Albany**  
22 Corporate Drive  
Clifton Park, NY 12065  
518-383-9144 (T)  
518-383-9166 (F)

## TRANSMITTAL

January 04, 2011

AECOM  
40 British American Boulevard  
Latham, New York 12110

Attn: Mr. Scott Serviss

E/Mail: [scott.serviss@aecom.com](mailto:scott.serviss@aecom.com)

Re: Soil Laboratory Testing  
NGP Site  
Norwich, New York  
ATL Project No.: AT1573

Dear Mr. Serviss:

Enclosed are the following reports:

AT1573SL-06B-12-10	Hydraulic Conductivity	December 21, 2010
AT1573SL-08B-12-10	Hydraulic Conductivity	December 21, 2010
AT1573SL-10B-12-10	Hydraulic Conductivity	December 21, 2010
AT1573SL-13B-12-10	Hydraulic Conductivity	December 21, 2010
AT1573SL-14B-12-10	Hydraulic Conductivity	December 21, 2010

Please contact our office should you have any questions or if we may be of further service.

Sincerely,  
ATLANTIC TESTING LABORATORIES, Limited

Robert E. Field  
Laboratory Manager  
[bfield@atlantictesting.com](mailto:bfield@atlantictesting.com)

REF/nd

Enclosures



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-6B-12-10

ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE: 1/04/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 12/21/10

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S6B  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 11-30, Cast 12/7/10  
Sample Type: 3x6 cylinder

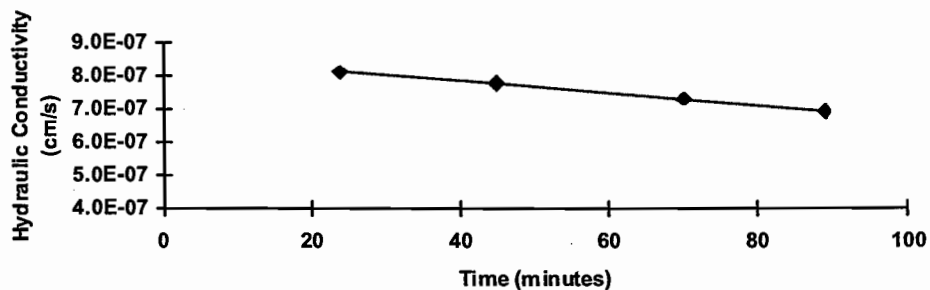
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	2.365	Weight (lbs):	2.408	Permeant Liquid:	Water
Sample Length (in):	5.512	Sample Length (in):	5.512	Test Method:	C
Sample Diameter (in):	2.996	Sample Diameter (in):	2.996	Saturation (%):	96
Area (in <sup>2</sup> ):	7.050	Area (in <sup>2</sup> ):	7.050	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	38.86	Volume (in <sup>3</sup> ):	38.86	Optimum Moisture Content (%):	N/A
Moisture Content (%):	46.0	Moisture Content (%):	48.6		
Dry Unit Weight (pcf):	72.1	Dry Unit Weight (pcf):	72.1		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$7.5 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 21 days when it was set up in the permeability cell.

Reviewed by:

Date:

1/4/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-8B-12-10 ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE: 1/04/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 12/21/10

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S8B  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 6-29, Cast 12/8/10  
Sample Type: 3x6 cylinder

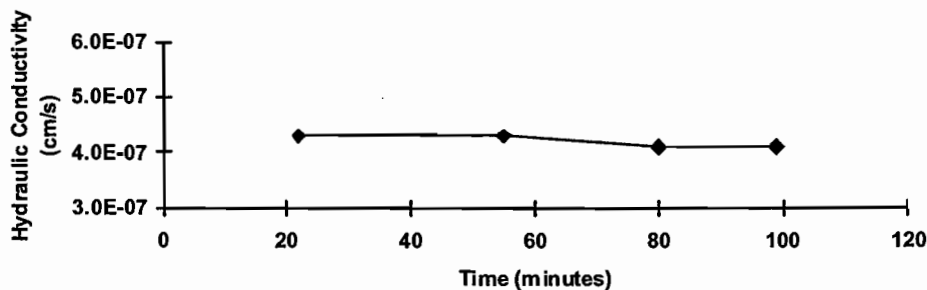
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	2.394	Weight (lbs):	2.424	Permeant Liquid:	Water
Sample Length (in):	5.551	Sample Length (in):	5.551	Test Method:	C
Sample Diameter (in):	3.000	Sample Diameter (in):	3.000	Saturation (%):	96
Area (in <sup>2</sup> ):	7.069	Area (in <sup>2</sup> ):	7.069	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	39.24	Volume (in <sup>3</sup> ):	39.24	Optimum Moisture Content (%):	N/A
Moisture Content (%):	48.6	Moisture Content (%):	50.5		
Dry Unit Weight (pcf):	71.0	Dry Unit Weight (pcf):	71.0		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$4.2 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 20 days when it was set up in the permeability cell.

Reviewed by:

Date:

1/4/11



# ATLANTIC TESTING LABORATORIES

**HYDRAULIC CONDUCTIVITY TEST AT1573SL-13B-12-10**  
**ASTM D 5084(using a flexible wall permeameter)**

## PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE: 1/04/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 12/21/10

## SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S13B  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 4-20, Cast 12/10/10  
Sample Type: 3x6 cylinder

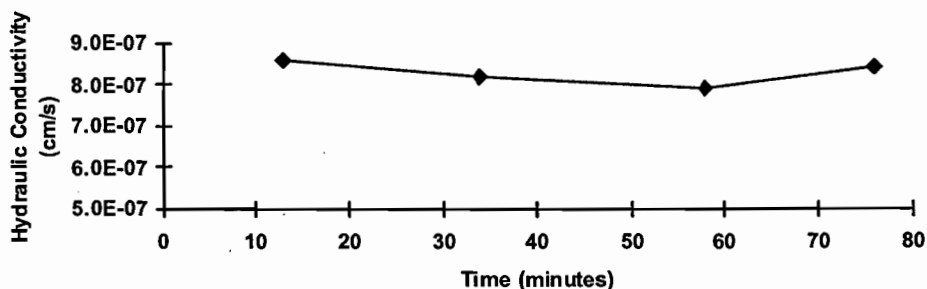
## SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	2.261	Weight (lbs):	2.284	Permeant Liquid:	Water
Sample Length (in):	5.315	Sample Length (in):	5.315	Test Method:	C
Sample Diameter (in):	3.000	Sample Diameter (in):	3.000	Saturation (%):	98
Area (in <sup>2</sup> ):	7.069	Area (in <sup>2</sup> ):	7.069	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	37.57	Volume (in <sup>3</sup> ):	37.57	Optimum Moisture Content (%):	N/A
Moisture Content (%):	54.1	Moisture Content (%):	55.7		
Dry Unit Weight (pcf):	67.5	Dry Unit Weight (pcf):	67.5		

## TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$8.3 \times 10^{-7}$

## HYDRAULIC CONDUCTIVITY vs. TIME



## REMARKS

Note: The sample age was 18 days when it was set up in the permeability cell.

Reviewed by:

Date:

1/4/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-14B-12-10 ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE: 1/04/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 12/21/10

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S14B  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 5-25, Cast 12/11/10  
Sample Type: 3x6 cylinder

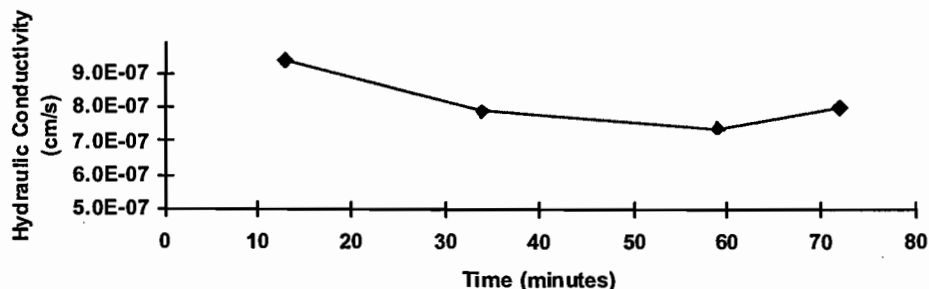
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	2.344	Weight (lbs):	2.361	Permeant Liquid:	Water
Sample Length (in):	5.591	Sample Length (in):	5.591	Test Method:	C
Sample Diameter (in):	3.000	Sample Diameter (in):	3.000	Saturation (%):	96
Area (in <sup>2</sup> ):	7.069	Area (in <sup>2</sup> ):	7.069	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	39.52	Volume (in <sup>3</sup> ):	39.52	Optimum Moisture Content (%):	N/A
Moisture Content (%):	55.2	Moisture Content (%):	56.4		
Dry Unit Weight (pcf):	66.0	Dry Unit Weight (pcf):	66.0		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$8.1 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 17 days when it was set up in the permeability cell.

Reviewed by:

Date:

1/4/11





# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-10B-12-10 ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE: 1/04/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 12/21/10

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S10B  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 5-30, Cast 12/9/10  
Sample Type: 3x6 cylinder

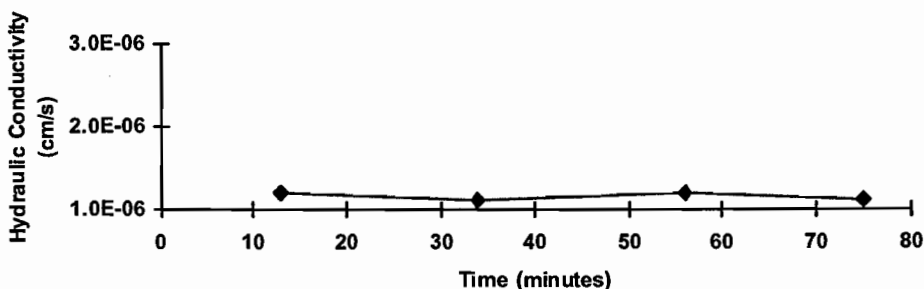
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	2.374	Weight (lbs):	2.398	Permeant Liquid:	Water
Sample Length (in):	5.394	Sample Length (in):	5.394	Test Method:	C
Sample Diameter (in):	3.00	Sample Diameter (in):	3.000	Saturation (%):	96
Area (in <sup>2</sup> ):	7.069	Area (in <sup>2</sup> ):	7.069	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	38.13	Volume (in <sup>3</sup> ):	38.13	Optimum Moisture Content (%):	N/A
Moisture Content (%):	44.8	Moisture Content (%):	46.3		
Dry Unit Weight (pcf):	74.3	Dry Unit Weight (pcf):	74.3		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	1.2 x 10 <sup>-6</sup>

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 19 days when it was set up in the permeability cell.

The sample did not meet the required 1.0 x 10<sup>-6</sup> cm/sec.

Reviewed by:

REF

Date:

1/4/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-10D-12-10 ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE: 1/10/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 12/21/10

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S10D, 28 day retest  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 5-30, Cast 12/09/10  
Sample Type: 3x6 cylinder

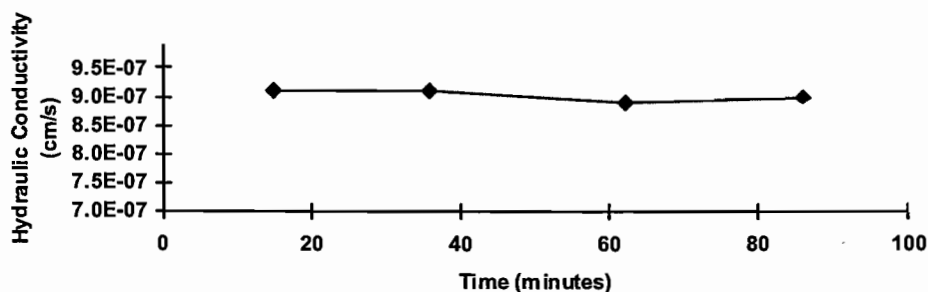
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	2.071	Weight (lbs):	2.088	Permeant Liquid:	Water
Sample Length (in):	4.685	Sample Length (in):	4.685	Test Method:	C
Sample Diameter (in):	3.000	Sample Diameter (in):	3.00	Saturation (%):	96
Area (in <sup>2</sup> ):	7.069	Area (in <sup>2</sup> ):	7.069	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	33.12	Volume (in <sup>3</sup> ):	33.12	Optimum Moisture Content (%):	N/A
Moisture Content (%):	46.3	Moisture Content (%):	47.5		
Dry Unit Weight (pcf):	73.9	Dry Unit Weight (pcf):	73.9		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$9.0 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 28 days when it was set up in the permeability cell on 1/6/2011.

Reviewed by:

Date:

1/10/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-15B-12-10

ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE: 1/06/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 12/21/10

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S15B  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 5-24, Cast 12/12/10  
Sample Type: 3x6 cylinder

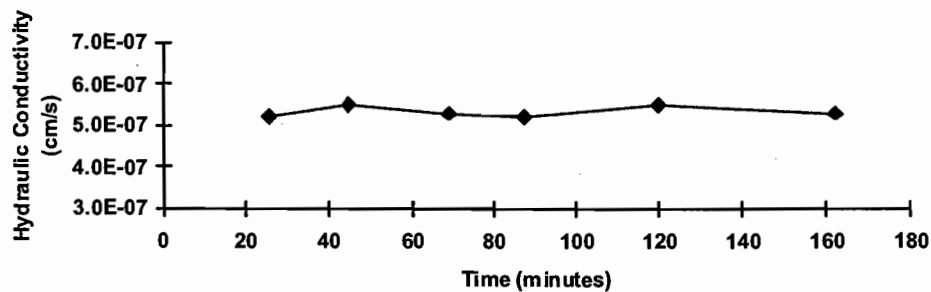
### SAMPLE INFORMATION

INITIAL	FINAL	PARAMETERS
Weight (lbs): 2.336	Weight (lbs): 2.371	Permeant Liquid: Water
Sample Length (in): 5.472	Sample Length (in): 5.472	Test Method: C
Sample Diameter (in): 2.996	Sample Diameter (in): 2.996	Saturation (%): 96
Area (in <sup>2</sup> ): 7.050	Area (in <sup>2</sup> ): 7.050	Maximum Dry Density (pcf): N/A
Volume (in <sup>3</sup> ): 38.58	Volume (in <sup>3</sup> ): 38.58	Optimum Moisture Content (%): N/A
Moisture Content (%): 50.4	Moisture Content (%): 52.6	
Dry Unit Weight (pcf): 69.6	Dry Unit Weight (pcf): 69.6	

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
66	55	57	9	11	2	$5.3 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 22 days when it was set up in the permeability cell on 1/3/2011.

Reviewed by: 

Date: 1/6/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-16C-12-10

ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE: 1/12/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 1/04/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S16C  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 15-25, Cast 12/13/10  
Sample Type: 3x6 cylinder

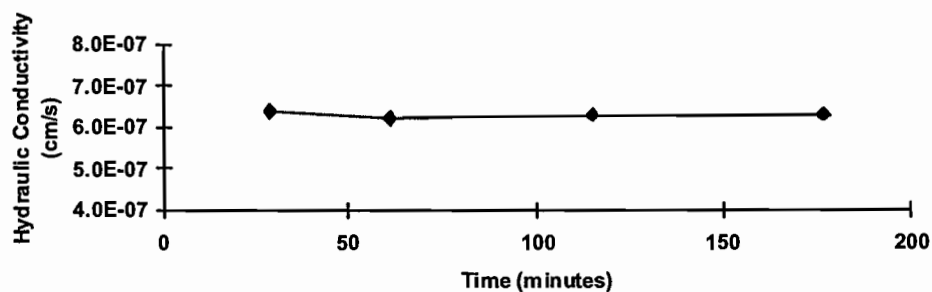
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	2.234	Weight (lbs):	2.265	Permeant Liquid:	Water
Sample Length (in):	5.236	Sample Length (in):	5.236	Test Method:	C
Sample Diameter (in):	3.000	Sample Diameter (in):	3.000	Saturation (%):	96
Area (in <sup>2</sup> ):	7.069	Area (in <sup>2</sup> ):	7.069	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	37.01	Volume (in <sup>3</sup> ):	37.01	Optimum Moisture Content (%):	N/A
Moisture Content (%):	52.1	Moisture Content (%):	54.2		
Dry Unit Weight (pcf):	68.6	Dry Unit Weight (pcf):	68.6		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
66	55	57	9	11	2	$6.3 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 28 days when it was set up in the permeability cell on 1/10/2011.

Reviewed by:

Date:

1/12/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-17C-12-10

ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE: 1/13/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 1/04/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S17C  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 17-24, Cast 12/14/10  
Sample Type: 3x6 cylinder

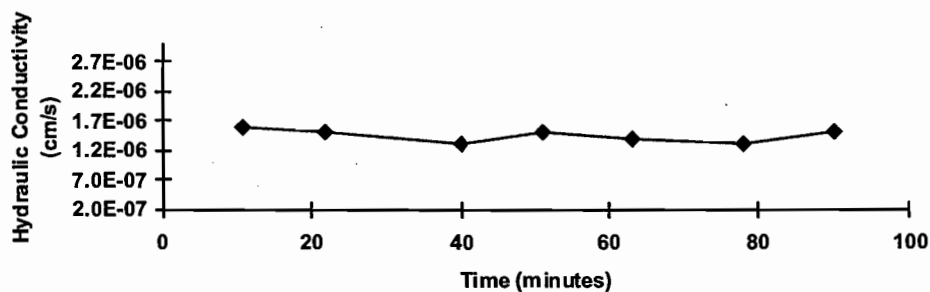
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	2.192	Weight (lbs):	2.215	Permeant Liquid:	Water
Sample Length (in):	5.079	Sample Length (in):	5.079	Test Method:	C
Sample Diameter (in):	2.992	Sample Diameter (in):	2.992	Saturation (%):	96
Area (in <sup>2</sup> ):	7.031	Area (in <sup>2</sup> ):	7.031	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	35.71	Volume (in <sup>3</sup> ):	35.71	Optimum Moisture Content (%):	N/A
Moisture Content (%):	48.7	Moisture Content (%):	50.3		
Dry Unit Weight (pcf):	71.4	Dry Unit Weight (pcf):	71.3		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$1.4 \times 10^{-6}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 28 days when it was set up in the permeability cell on 1/11/2011.

Reviewed by:

Date:

1/13/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-19B-12-10 ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE: 1/13/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 1/04/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S19B  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 21-21, Cast 12/16/10  
Sample Type: 3x6 cylinder

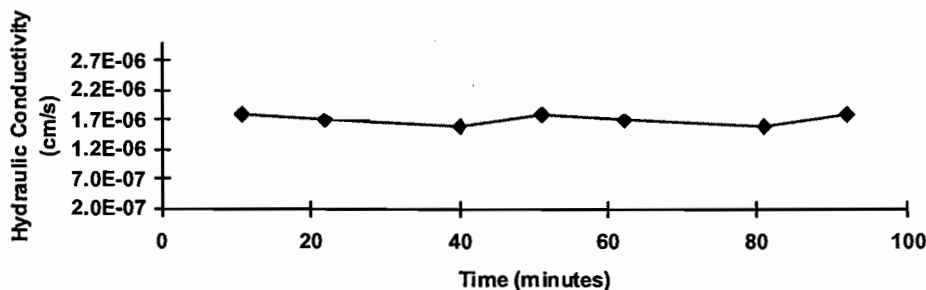
### SAMPLE INFORMATION

INITIAL	FINAL	PARAMETERS
Weight (lbs): 2.191	Weight (lbs): 2.212	Permeant Liquid: Water
Sample Length (in): 5.118	Sample Length (in): 5.118	Test Method: C
Sample Diameter (in): 2.996	Sample Diameter (in): 2.996	Saturation (%): 96
Area (in <sup>2</sup> ): 7.049	Area (in <sup>2</sup> ): 7.049	Maximum Dry Density (pcf): N/A
Volume (in <sup>3</sup> ): 36.07	Volume (in <sup>3</sup> ): 36.07	Optimum Moisture Content (%): N/A
Moisture Content (%): 50.2	Moisture Content (%): 51.6	
Dry Unit Weight (pcf): 69.8	Dry Unit Weight (pcf): 69.9	

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	1.7 x 10 <sup>-6</sup>

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 26 days when it was set up in the permeability cell on 1/11/2011.

Reviewed by:

Date:

1/13/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-22A-12-10 ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE: 1/13/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 1/04/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S22A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 29-15, Cast 12/20/10  
Sample Type: 3x6 cylinder

### SAMPLE INFORMATION

#### INITIAL

Weight (lbs): 2.121  
Sample Length (in): 5.157  
Sample Diameter (in): 2.992  
Area (in<sup>2</sup>): 7.031  
Volume (in<sup>3</sup>): 36.26  
Moisture Content (%): 55.6  
Dry Unit Weight (pcf): 64.9

#### FINAL

Weight (lbs): 2.150  
Sample Length (in): 5.157  
Sample Diameter (in): 2.992  
Area (in<sup>2</sup>): 7.031  
Volume (in<sup>3</sup>): 36.26  
Moisture Content (%): 57.7  
Dry Unit Weight (pcf): 65.0

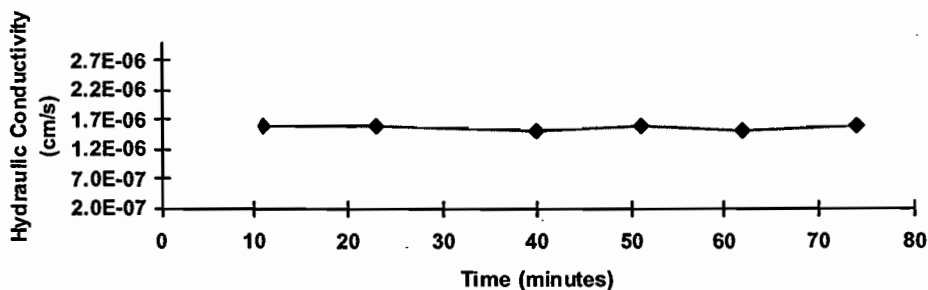
#### PARAMETERS

Permeant Liquid: Water  
Test Method: C  
Saturation (%): 98  
Maximum Dry Density (pcf): N/A  
Optimum Moisture Content (%): N/A

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$1.6 \times 10^{-6}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 22 days when it was set up in the permeability cell on 1/11/2011.

Reviewed by:

Date:

1/13/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-24A-1-11

ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE: 1/13/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 1/06/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S24A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 32-11, Cast 1/4/11  
Sample Type: 3x6 cylinder

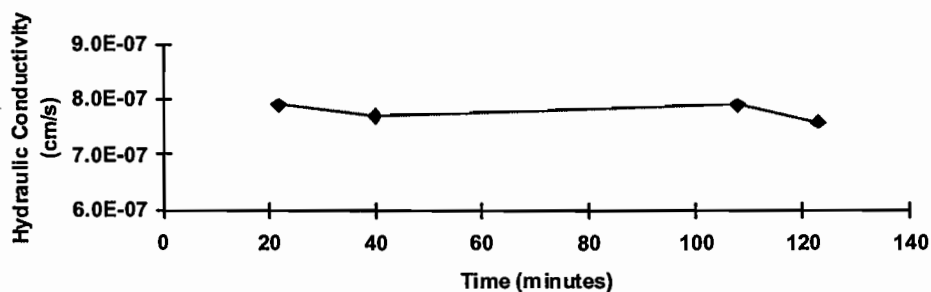
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	2.359	Weight (lbs):	2.387	Permeant Liquid:	Water
Sample Length (in):	5.236	Sample Length (in):	5.236	Test Method:	C
Sample Diameter (in):	2.992	Sample Diameter (in):	2.992	Saturation (%):	96
Area (in <sup>2</sup> ):	7.031	Area (in <sup>2</sup> ):	7.031	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	36.81	Volume (in <sup>3</sup> ):	36.81	Optimum Moisture Content (%):	N/A
Moisture Content (%):	42.5	Moisture Content (%):	44.2		
Dry Unit Weight (pcf):	77.7	Dry Unit Weight (pcf):	77.7		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$7.8 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 7 days when it was set up in the permeability cell on 1/11/2011.

Reviewed by:

Date:

1/13/11





# ATLANTIC TESTING LABORATORIES

## Albany

22 Corporate Drive  
Clifton Park, NY 12065  
518-383-9144 (T)  
518-383-9166 (F)

## TRANSMITTAL

February 10, 2011

AECOM  
40 British American Boulevard  
Latham, New York 12110

Attn: Mr. Scott Serviss

E/Mail: [scott.serviss@aecom.com](mailto:scott.serviss@aecom.com)

Re: Soil Laboratory Testing  
NGP Site  
Norwich, New York  
ATL Project No.: AT1573

Dear Mr. Serviss:

Enclosed are the following reports:

AT1573SL-48-2-11	Unconfined Compressive Strength	February 4, 2011
AT1573SL-17D-12-10	Hydraulic Conductivity	February 4, 2011
AT1573SL-23B-1-11	Hydraulic Conductivity	January 13, 2011
AT1573SL-30B-1-11	Hydraulic Conductivity	January 25, 2011
AT1573SL-31A-1-11	Hydraulic Conductivity	January 25, 2011
AT1573SL-32A-1-11	Hydraulic Conductivity	January 25, 2011

Please contact our office should you have any questions or if we may be of further service.

Sincerely,  
ATLANTIC TESTING LABORATORIES, Limited

Robert E. Field  
Laboratory Manager  
[bfield@atlantictesting.com](mailto:bfield@atlantictesting.com)

REF/nd

Enclosures



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-17D-12-10

ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE : 2/10/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 2/04/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S17D  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 17-24, Cast 12/14/10  
Sample Type: 3x6 cylinder

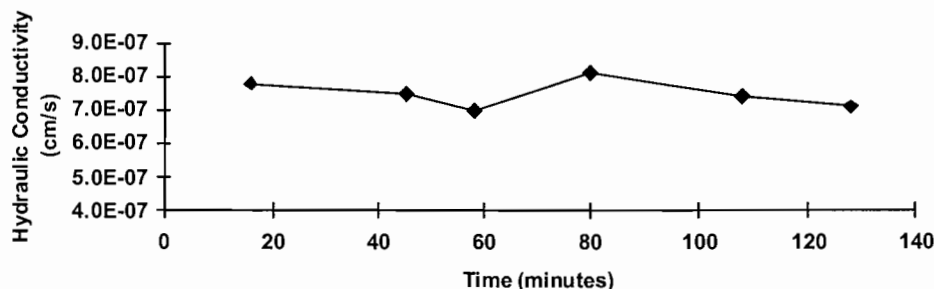
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	2.072	Weight (lbs):	2.097	Permeant Liquid:	Water
Sample Length (in):	4.764	Sample Length (in):	4.764	Test Method:	C
Sample Diameter (in):	3.004	Sample Diameter (in):	3.004	Saturation (%):	96
Area (in <sup>2</sup> ):	7.087	Area (in <sup>2</sup> ):	7.087	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	33.76	Volume (in <sup>3</sup> ):	33.76	Optimum Moisture Content (%):	N/A
Moisture Content (%):	48.2	Moisture Content (%):	50.0		
Dry Unit Weight (pcf):	71.6	Dry Unit Weight (pcf):	71.6		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$7.5 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 55 days when it was set up in the permeability cell on 2/7/2011.

Reviewed by:

Date:

2/10/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-23B-1-11

ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE : 2/10/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 1/13/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S23B  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 29-13, Cast 1/3/11  
Sample Type: 3x6 cylinder

### SAMPLE INFORMATION

#### INITIAL

Weight (lbs): 2.028  
Sample Length (in): 4.803  
Sample Diameter (in): 3.004  
Area (in<sup>2</sup>): 7.087  
Volume (in<sup>3</sup>): 34.04  
Moisture Content (%): 53.5  
Dry Unit Weight (pcf): 67.0

#### FINAL

Weight (lbs): 2.056  
Sample Length (in): 4.803  
Sample Diameter (in): 3.004  
Area (in<sup>2</sup>): 7.087  
Volume (in<sup>3</sup>): 34.04  
Moisture Content (%): 55.6  
Dry Unit Weight (pcf): 67.1

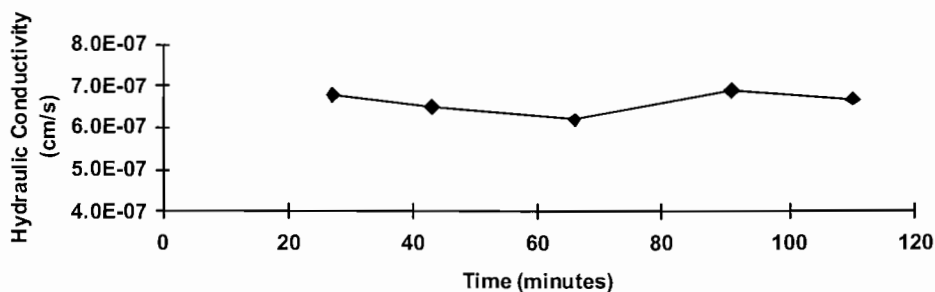
#### PARAMETERS

Permeant Liquid: Water  
Test Method: C  
Saturation (%): 96  
Maximum Dry Density (pcf): N/A  
Optimum Moisture Content (%): N/A

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$6.6 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 35 days when it was set up in the permeability cell on 2/7/2011.

Reviewed by:

Date:

2/10/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-30B-1-11

ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE : 2/10/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 1/25/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S30B  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 48-3, Cast 1/10/11  
Sample Type: 3x6 cylinder

### SAMPLE INFORMATION

#### INITIAL

Weight (lbs): 2.178  
Sample Length (in): 5.000  
Sample Diameter (in): 3.004  
Area (in<sup>2</sup>): 7.087  
Volume (in<sup>3</sup>): 39.45  
Moisture Content (%): 47.7  
Dry Unit Weight (pcf): 71.9

#### FINAL

Weight (lbs): 2.207  
Sample Length (in): 5.000  
Sample Diameter (in): 3.004  
Area (in<sup>2</sup>): 7.087  
Volume (in<sup>3</sup>): 39.45  
Moisture Content (%): 49.7  
Dry Unit Weight (pcf): 71.9

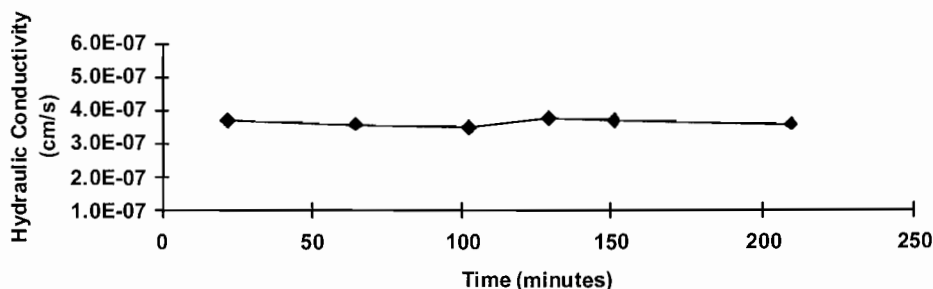
#### PARAMETERS

Permeant Liquid: Water  
Test Method: C  
Saturation (%): 96  
Maximum Dry Density (pcf): N/A  
Optimum Moisture Content (%): N/A

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$3.7 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 28 days when it was set up in the permeability cell on 2/7/2011.

Reviewed by:

Date:

2/10/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-31A-1-11

ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE : 2/10/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 1/25/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S31A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 47-5, Cast 1/11/11  
Sample Type: 3x6 cylinder

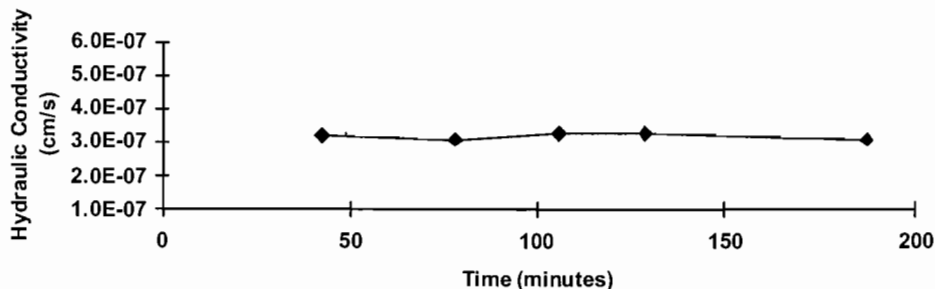
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	2.271	Weight (lbs):	2.294	Permeant Liquid:	Water
Sample Length (in):	5.000	Sample Length (in):	5.000	Test Method:	C
Sample Diameter (in):	3.004	Sample Diameter (in):	3.004	Saturation (%):	96
Area (in <sup>2</sup> ):	7.087	Area (in <sup>2</sup> ):	7.087	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	35.44	Volume (in <sup>3</sup> ):	35.44	Optimum Moisture Content (%):	N/A
Moisture Content (%):	40.5	Moisture Content (%):	41.9		
Dry Unit Weight (pcf):	78.9	Dry Unit Weight (pcf):	78.9		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$3.2 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 27 days when it was set up in the permeability cell on 2/7/2011.

Reviewed by:

Date:

2/10/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-32A-1-11

ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE : 2/10/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 1/25/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S32A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 46-6, Cast 1/12/11  
Sample Type: 3x6 cylinder

### SAMPLE INFORMATION

#### INITIAL

Weight (lbs): 2.224  
Sample Length (in): 5.000  
Sample Diameter (in): 3.004  
Area (in<sup>2</sup>): 7.087  
Volume (in<sup>3</sup>): 35.44  
Moisture Content (%): 43.3  
Dry Unit Weight (pcf): 75.7

#### FINAL

Weight (lbs): 2.248  
Sample Length (in): 5.000  
Sample Diameter (in): 3.004  
Area (in<sup>2</sup>): 7.087  
Volume (in<sup>3</sup>): 35.44  
Moisture Content (%): 44.9  
Dry Unit Weight (pcf): 75.6

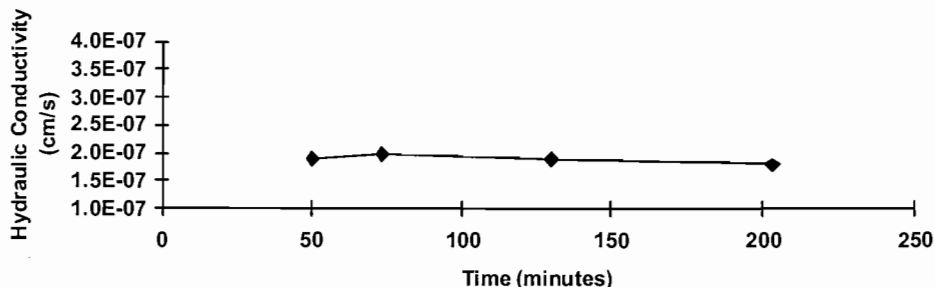
#### PARAMETERS

Permeant Liquid: Water  
Test Method: C  
Saturation (%): 96  
Maximum Dry Density (pcf): N/A  
Optimum Moisture Content (%): N/A

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$1.9 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 26 days when it was set up in the permeability cell on 2/7/2011.

Reviewed by: \_\_\_\_\_

Date: \_\_\_\_\_

2/10/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-18B-12-10

ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE: 1/11/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 1/04/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S18B  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 17-22, Cast 12/15/10  
Sample Type: 3x6 cylinder

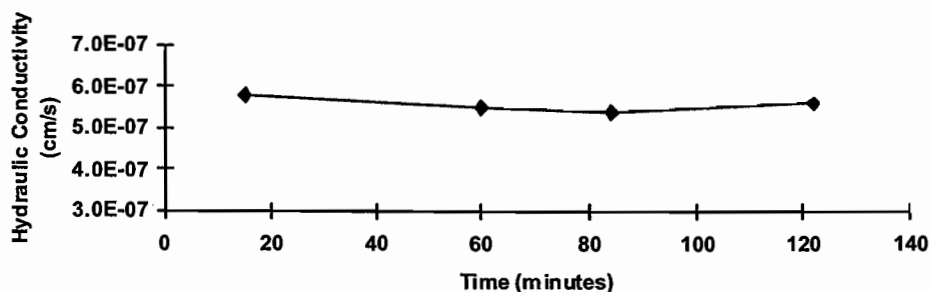
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	2.228	Weight (lbs):	2.259	Permeant Liquid:	Water
Sample Length (in):	5.433	Sample Length (in):	5.433	Test Method:	C
Sample Diameter (in):	2.992	Sample Diameter (in):	2.992	Saturation (%):	98
Area (in <sup>2</sup> ):	7.031	Area (in <sup>2</sup> ):	7.031	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	38.20	Volume (in <sup>3</sup> ):	38.20	Optimum Moisture Content (%):	N/A
Moisture Content (%):	57.9	Moisture Content (%):	60.1		
Dry Unit Weight (pcf):	63.8	Dry Unit Weight (pcf):	63.8		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$5.6 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 22 days when it was set up in the permeability cell on 1/6/2011.

Reviewed by:

Date:

1/11/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-20B-12-10

ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE: 1/11/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 1/04/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S20B  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 24-19, Cast 12/17/10  
Sample Type: 3x6 cylinder

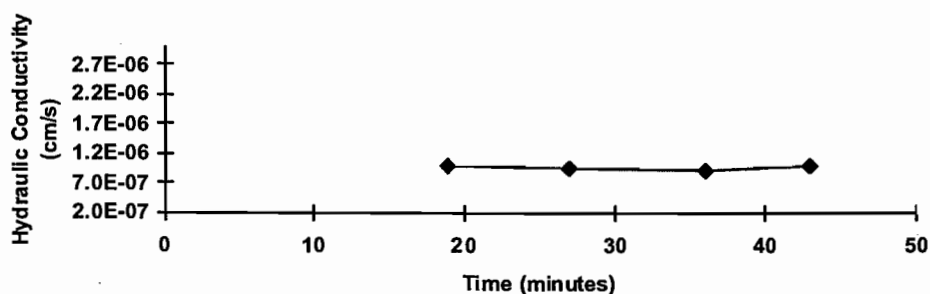
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	2.237	Weight (lbs):	2.258	Permeant Liquid:	Water
Sample Length (in):	5.197	Sample Length (in):	5.197	Test Method:	C
Sample Diameter (in):	2.996	Sample Diameter (in):	2.996	Saturation (%):	98
Area (in <sup>2</sup> ):	7.050	Area (in <sup>2</sup> ):	7.050	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	36.64	Volume (in <sup>3</sup> ):	36.64	Optimum Moisture Content (%):	N/A
Moisture Content (%):	51.9	Moisture Content (%):	53.3		
Dry Unit Weight (pcf):	69.5	Dry Unit Weight (pcf):	69.5		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$9.7 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 21 days when it was set up in the permeability cell on 1/6/2011.

Reviewed by:

Date:

1/11/11





# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-21B-12-10

ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE: 1/11/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 1/04/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S21B  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 24-17, Cast 12/18/10  
Sample Type: 3x6 cylinder

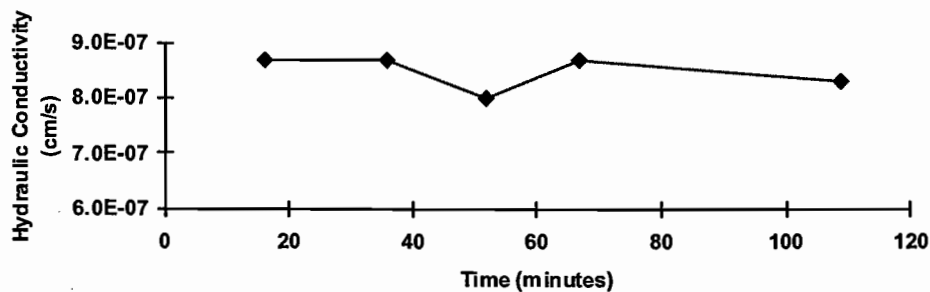
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	2.243	Weight (lbs):	2.264	Permeant Liquid:	Water
Sample Length (in):	5.354	Sample Length (in):	5.354	Test Method:	C
Sample Diameter (in):	2.992	Sample Diameter (in):	2.992	Saturation (%):	96
Area (in <sup>2</sup> ):	7.031	Area (in <sup>2</sup> ):	7.031	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	37.64	Volume (in <sup>3</sup> ):	37.64	Optimum Moisture Content (%):	N/A
Moisture Content (%):	56.0	Moisture Content (%):	57.5		
Dry Unit Weight (pcf):	66.0	Dry Unit Weight (pcf):	66.0		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$8.5 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 19 days when it was set up in the permeability cell on 1/6/2011.

Reviewed by:

Date:

1/11/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-19D-12-10

ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE: 2/16/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 2/04/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S19D  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 21-21, Cast 12/16/10  
Sample Type: 3x6 cylinder

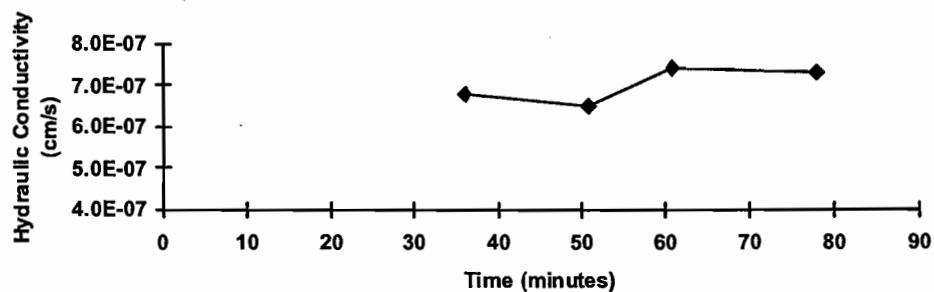
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	1.923	Weight (lbs):	1.944	Permeant Liquid:	Water
Sample Length (in):	4.488	Sample Length (in):	4.488	Test Method:	C
Sample Diameter (in):	3.000	Sample Diameter (in):	3.000	Saturation (%):	95
Area (in <sup>2</sup> ):	7.069	Area (in <sup>2</sup> ):	7.069	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	31.73	Volume (in <sup>3</sup> ):	31.73	Optimum Moisture Content (%):	N/A
Moisture Content (%):	49.7	Moisture Content (%):	51.4		
Dry Unit Weight (pcf):	69.9	Dry Unit Weight (pcf):	69.9		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$7.0 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 56 days when it was set up in the permeability cell on 2/10/2011.

Reviewed by:

Date:

2/16/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-33A-1-11 ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE: 2/16/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 1/25/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S33A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 44-4, Cast 1/13/11  
Sample Type: 3x6 cylinder

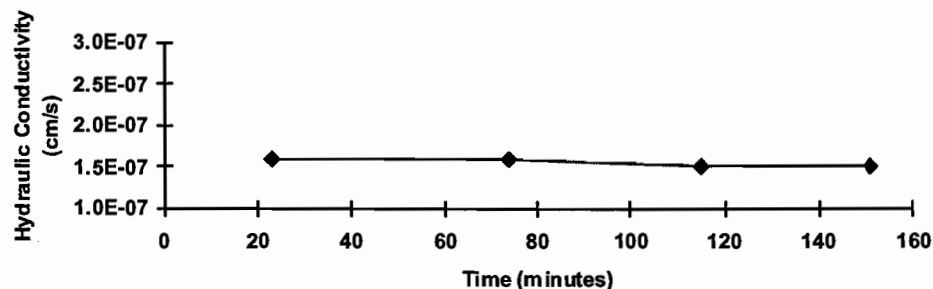
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	2.013	Weight (lbs):	2.038	Permeant Liquid:	Water
Sample Length (in):	4.606	Sample Length (in):	4.606	Test Method:	C
Sample Diameter (in):	3.000	Sample Diameter (in):	3.000	Saturation (%):	96
Area (in <sup>2</sup> ):	7.069	Area (in <sup>2</sup> ):	7.069	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	32.56	Volume (in <sup>3</sup> ):	32.56	Optimum Moisture Content (%):	N/A
Moisture Content (%):	45.1	Moisture Content (%):	46.9		
Dry Unit Weight (pcf):	73.7	Dry Unit Weight (pcf):	73.7		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$1.6 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 28 days when it was set up in the permeability cell on 2/10/2011.

Reviewed by:

Date:

2/16/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-34A-1-11

ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE : 2/16/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 1/25/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S34A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 43-4, Cast 1/14/11  
Sample Type: 3x6 cylinder

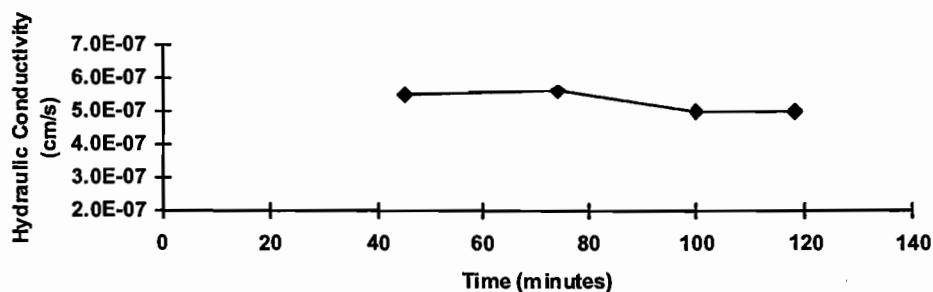
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	2.150	Weight (lbs):	2.184	Permeant Liquid:	Water
Sample Length (in):	4.843	Sample Length (in):	4.843	Test Method:	C
Sample Diameter (in):	3.000	Sample Diameter (in):	3.000	Saturation (%):	96
Area (in <sup>2</sup> ):	7.069	Area (in <sup>2</sup> ):	7.069	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	34.24	Volume (in <sup>3</sup> ):	34.24	Optimum Moisture Content (%):	N/A
Moisture Content (%):	40.3	Moisture Content (%):	42.5		
Dry Unit Weight (pcf):	77.4	Dry Unit Weight (pcf):	77.4		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$5.3 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 27 days when it was set up in the permeability cell on 2/10/2011.

Reviewed by:

Date:

2/16/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-35A-1-11 ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE : 2/16/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 1/25/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S35A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 42-2, Cast 1/14/11  
Sample Type: 3x6 cylinder

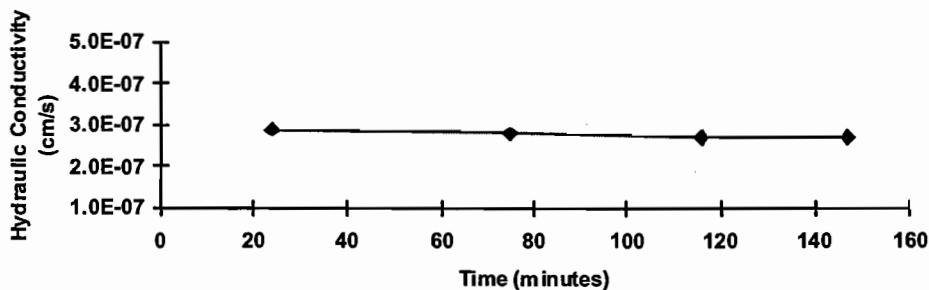
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	2.237	Weight (lbs):	2.259	Permeant Liquid:	Water
Sample Length (in):	4.843	Sample Length (in):	4.843	Test Method:	C
Sample Diameter (in):	3.004	Sample Diameter (in):	3.004	Saturation (%):	96
Area (in <sup>2</sup> ):	7.087	Area (in <sup>2</sup> ):	7.087	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	34.32	Volume (in <sup>3</sup> ):	34.32	Optimum Moisture Content (%):	N/A
Moisture Content (%):	38.3	Moisture Content (%):	39.7		
Dry Unit Weight (pcf):	81.5	Dry Unit Weight (pcf):	81.5		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$2.8 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 27 days when it was set up in the permeability cell on 2/10/2011.

Reviewed by:

Date:

2/16/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-36A-1-11 ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE: 2/16/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 1/25/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S36A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 37-1, Cast 1/15/11  
Sample Type: 3x6 cylinder

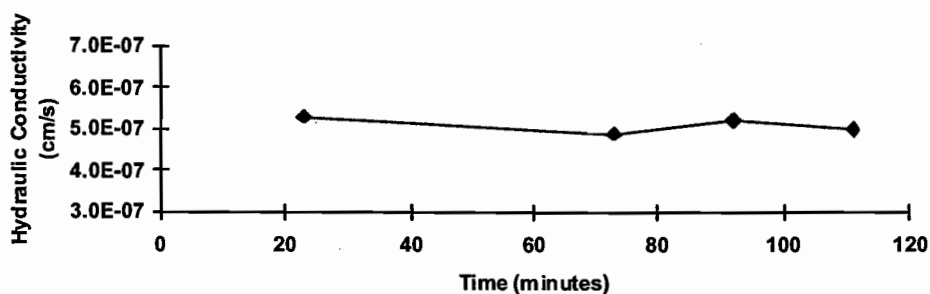
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	2.119	Weight (lbs):	2.139	Permeant Liquid:	Water
Sample Length (in):	4.528	Sample Length (in):	4.528	Test Method:	C
Sample Diameter (in):	3.000	Sample Diameter (in):	3.000	Saturation (%):	95
Area (in <sup>2</sup> ):	7.069	Area (in <sup>2</sup> ):	7.069	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	32.01	Volume (in <sup>3</sup> ):	32.01	Optimum Moisture Content (%):	N/A
Moisture Content (%):	35.4	Moisture Content (%):	36.7		
Dry Unit Weight (pcf):	84.6	Dry Unit Weight (pcf):	84.5		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$5.1 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 26 days when it was set up in the permeability cell on 2/10/2011.

Reviewed by:

Date:

2/16/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-22C-12-10

ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE : 2/18/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 2/04/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S22C  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 29-15, Cast 12/20/10  
Sample Type: 3x6 cylinder

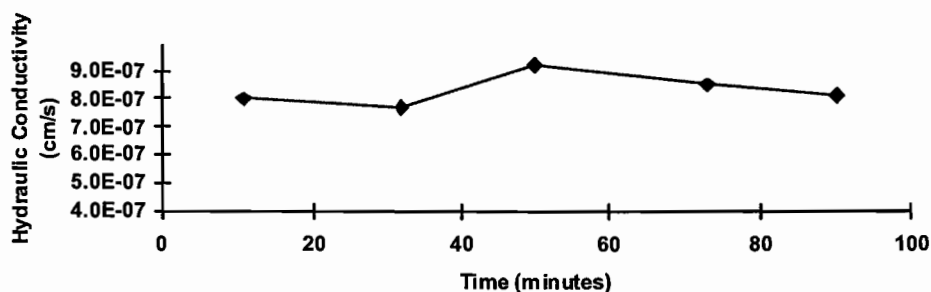
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	1.871	Weight (lbs):	1.899	Permeant Liquid:	Water
Sample Length (in):	4.173	Sample Length (in):	4.173	Test Method:	C
Sample Diameter (in):	3.004	Sample Diameter (in):	3.004	Saturation (%):	96
Area (in <sup>2</sup> ):	7.087	Area (in <sup>2</sup> ):	7.087	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	29.57	Volume (in <sup>3</sup> ):	29.57	Optimum Moisture Content (%):	N/A
Moisture Content (%):	55.9	Moisture Content (%):	58.2		
Dry Unit Weight (pcf):	70.1	Dry Unit Weight (pcf):	70.2		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$8.3 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 57 days when it was set up in the permeability cell on 2/15/2011.

Reviewed by:

Date:

2/18/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-37A-1-11

ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE: 2/18/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 2/01/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S37A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 40-7, Cast 1/19/2011  
Sample Type: 3x6 cylinder

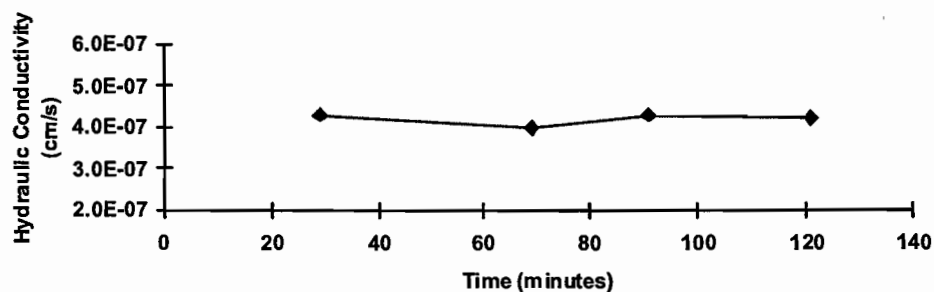
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	2.089	Weight (lbs):	2.105	Permeant Liquid:	Water
Sample Length (in):	4.685	Sample Length (in):	4.685	Test Method:	C
Sample Diameter (in):	3.004	Sample Diameter (in):	3.004	Saturation (%):	96
Area (in <sup>2</sup> ):	7.087	Area (in <sup>2</sup> ):	7.087	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	33.20	Volume (in <sup>3</sup> ):	33.20	Optimum Moisture Content (%):	N/A
Moisture Content (%):	45.4	Moisture Content (%):	46.4		
Dry Unit Weight (pcf):	74.8	Dry Unit Weight (pcf):	74.9		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$4.2 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 29 days when it was set up in the permeability cell on 2/15/2011.

Reviewed by:

Date:

2/18/11





# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-38A-1-11 ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE : 2/18/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 2/01/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S38A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 39-6, Cast 1/21/2011  
Sample Type: 3x6 cylinder

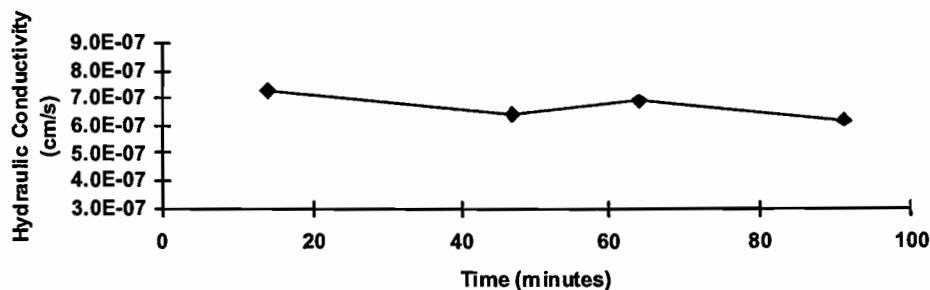
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	2.023	Weight (lbs):	2.044	Permeant Liquid:	Water
Sample Length (in):	4.567	Sample Length (in):	4.567	Test Method:	C
Sample Diameter (in):	3.004	Sample Diameter (in):	3.004	Saturation (%):	96
Area (in <sup>2</sup> ):	7.087	Area (in <sup>2</sup> ):	7.087	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	32.37	Volume (in <sup>3</sup> ):	32.37	Optimum Moisture Content (%):	N/A
Moisture Content (%):	44.2	Moisture Content (%):	45.7		
Dry Unit Weight (pcf):	74.9	Dry Unit Weight (pcf):	74.9		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$6.7 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 25 days when it was set up in the permeability cell on 2/15/2011.

Reviewed by:

Date:

2/18/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-39A-1-11

ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE: 2/18/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 2/01/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S39A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 37-7, Cast 1/21/2011  
Sample Type: 3x6 cylinder

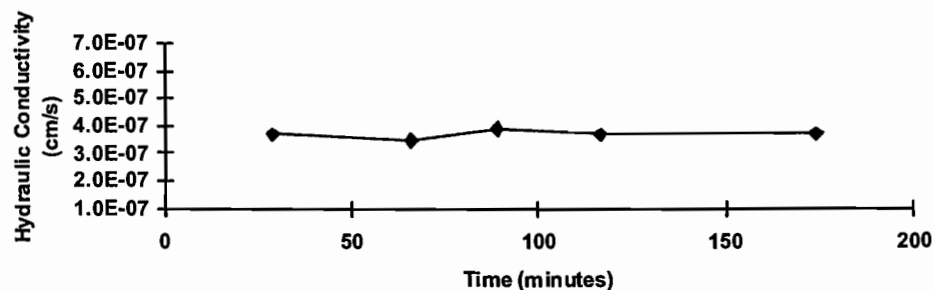
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	1.964	Weight (lbs):	1.988	Permeant Liquid:	Water
Sample Length (in):	4.528	Sample Length (in):	4.528	Test Method:	C
Sample Diameter (in):	3.004	Sample Diameter (in):	3.004	Saturation (%):	96
Area (in <sup>2</sup> ):	7.087	Area (in <sup>2</sup> ):	7.087	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	32.09	Volume (in <sup>3</sup> ):	32.09	Optimum Moisture Content (%):	N/A
Moisture Content (%):	47.5	Moisture Content (%):	49.3		
Dry Unit Weight (pcf):	71.7	Dry Unit Weight (pcf):	71.7		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$3.7 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 25 days when it was set up in the permeability cell on 2/15/2011.

Reviewed by:

Date:

2/18/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-40A-1-11 ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE: 2/18/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 2/01/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S40A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 36-2, Cast 1/22/2011  
Sample Type: 3x6 cylinder

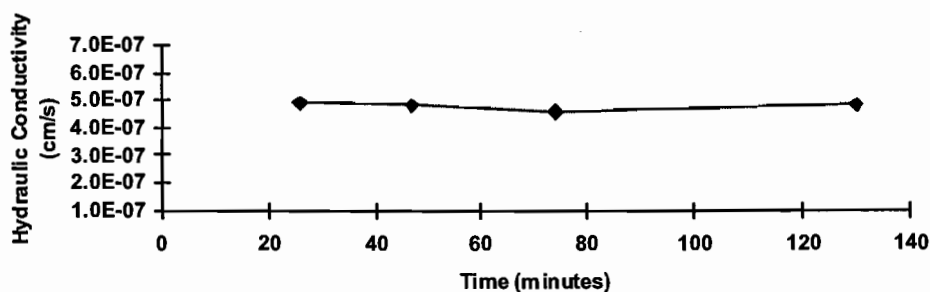
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	1.993	Weight (lbs):	2.015	Permeant Liquid:	Water
Sample Length (in):	4.409	Sample Length (in):	4.409	Test Method:	C
Sample Diameter (in):	3.004	Sample Diameter (in):	3.004	Saturation (%):	96
Area (in <sup>2</sup> ):	7.087	Area (in <sup>2</sup> ):	7.087	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	31.25	Volume (in <sup>3</sup> ):	31.25	Optimum Moisture Content (%):	N/A
Moisture Content (%):	40.3	Moisture Content (%):	41.8		
Dry Unit Weight (pcf):	78.5	Dry Unit Weight (pcf):	78.6		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$4.8 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 24 days when it was set up in the permeability cell on 2/15/2011.

Reviewed by:

Date:

2/18/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-25A-1-11 ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE: 1/17/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 1/11/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S25A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 37-9, Cast 1/5/11  
Sample Type: 3x6 cylinder

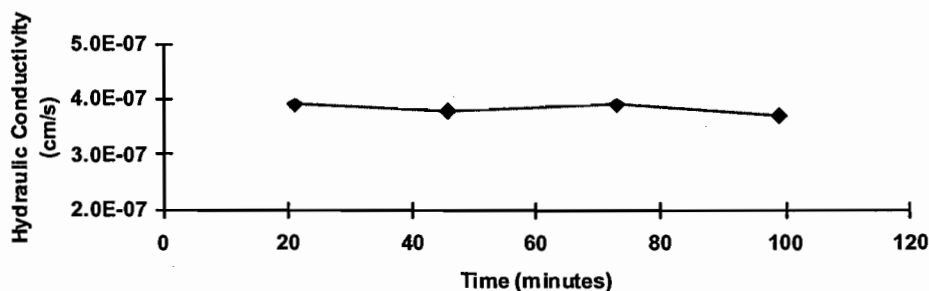
### SAMPLE INFORMATION

INITIAL	FINAL	PARAMETERS
Weight (lbs): 2.288	Weight (lbs): 2.310	Permeant Liquid: Water
Sample Length (in): 5.157	Sample Length (in): 5.157	Test Method: C
Sample Diameter (in): 2.996	Sample Diameter (in): 2.996	Saturation (%): 96
Area (in <sup>2</sup> ): 7.049	Area (in <sup>2</sup> ): 7.049	Maximum Dry Density (pcf): N/A
Volume (in <sup>3</sup> ): 36.35	Volume (in <sup>3</sup> ): 36.35	Optimum Moisture Content (%): N/A
Moisture Content (%): 48.0	Moisture Content (%): 49.5	
Dry Unit Weight (pcf): 73.4	Dry Unit Weight (pcf): 73.4	

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$3.8 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 7 days when it was set up in the permeability cell on 1/12/2011.

Reviewed by: 

Date: 1/17/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-26A-1-11 ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE : 1/17/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 1/11/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S26A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 41-9, Cast 1/6/11  
Sample Type: 3x6 cylinder

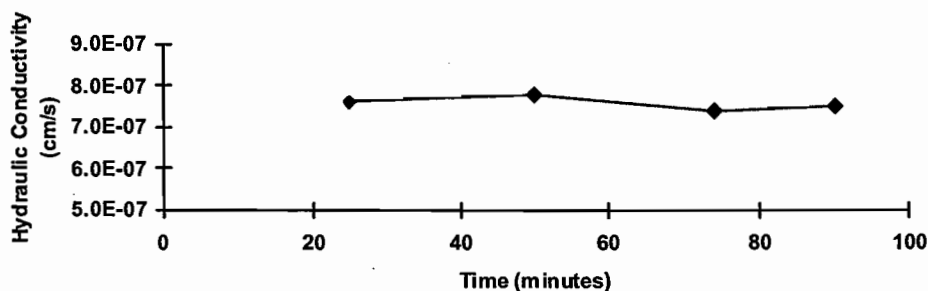
### SAMPLE INFORMATION

INITIAL	FINAL	PARAMETERS
Weight (lbs): 2.269	Weight (lbs): 2.282	Permeant Liquid: Water
Sample Length (in): 5.039	Sample Length (in): 5.039	Test Method: C
Sample Diameter (in): 2.992	Sample Diameter (in): 2.992	Saturation (%): 96
Area (in <sup>2</sup> ): 7.031	Area (in <sup>2</sup> ): 7.031	Maximum Dry Density (pcf): N/A
Volume (in <sup>3</sup> ): 35.43	Volume (in <sup>3</sup> ): 35.43	Optimum Moisture Content (%): N/A
Moisture Content (%): 45.3	Moisture Content (%): 46.1	
Dry Unit Weight (pcf): 76.2	Dry Unit Weight (pcf): 76.2	

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$7.6 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 6 days when it was set up in the permeability cell on 1/12/2011.

Reviewed by:

Date:

1/17/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-41A-1-11

ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE : 3/3/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 2/01/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S41A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 34-2, Cast 1/25/2011  
Sample Type: 3x6 cylinder

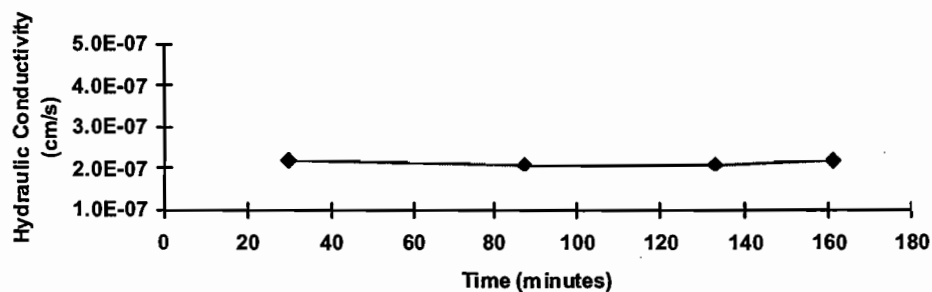
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	1.978	Weight (lbs):	2.004	Permeant Liquid:	Water
Sample Length (in):	4.409	Sample Length (in):	4.409	Test Method:	C
Sample Diameter (in):	3.004	Sample Diameter (in):	3.004	Saturation (%):	98
Area (in <sup>2</sup> ):	7.087	Area (in <sup>2</sup> ):	7.087	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	31.25	Volume (in <sup>3</sup> ):	31.25	Optimum Moisture Content (%):	N/A
Moisture Content (%):	39.5	Moisture Content (%):	41.2		
Dry Unit Weight (pcf):	78.4	Dry Unit Weight (pcf):	78.5		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$2.2 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 30 days when it was set up in the permeability cell on 2/24/2011.

Reviewed by:

Date:

3/3/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-42A-1-11

ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE : 3/3/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 2/01/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S42A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 34-6, Cast 1/26/2011  
Sample Type: 3x6 cylinder

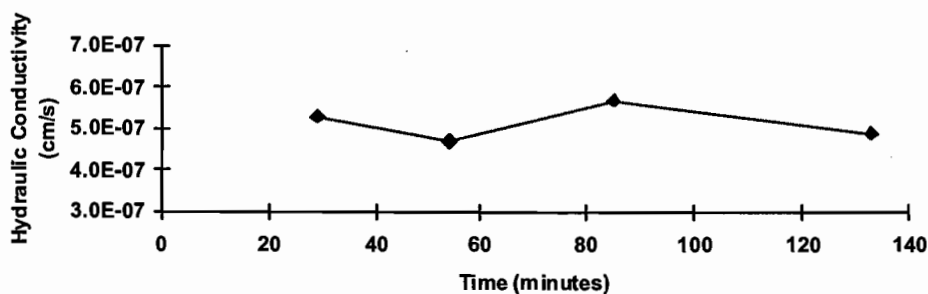
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	2.029	Weight (lbs):	2.055	Permeant Liquid:	Water
Sample Length (in):	4.528	Sample Length (in):	4.528	Test Method:	C
Sample Diameter (in):	3.004	Sample Diameter (in):	3.004	Saturation (%):	96
Area (in <sup>2</sup> ):	7.087	Area (in <sup>2</sup> ):	7.087	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	32.09	Volume (in <sup>3</sup> ):	32.09	Optimum Moisture Content (%):	N/A
Moisture Content (%):	40.0	Moisture Content (%):	41.8		
Dry Unit Weight (pcf):	78.1	Dry Unit Weight (pcf):	78.1		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$5.2 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 27 days when it was set up in the permeability cell on 2/24/2011.

Reviewed by:

Date:

3/3/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-43A-1-11

ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE : 3/3/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 2/01/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S43A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 30-1, Cast 1/27/2011  
Sample Type: 3x6 cylinder

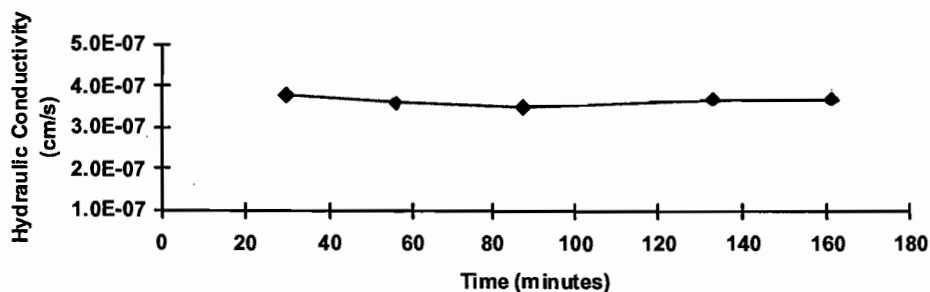
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	2.094	Weight (lbs):	2.121	Permeant Liquid:	Water
Sample Length (in):	4.646	Sample Length (in):	4.646	Test Method:	C
Sample Diameter (in):	3.004	Sample Diameter (in):	3.004	Saturation (%):	98
Area (in <sup>2</sup> ):	7.087	Area (in <sup>2</sup> ):	7.087	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	32.93	Volume (in <sup>3</sup> ):	32.93	Optimum Moisture Content (%):	N/A
Moisture Content (%):	38.8	Moisture Content (%):	40.6		
Dry Unit Weight (pcf):	79.2	Dry Unit Weight (pcf):	79.2		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$3.7 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 28 days when it was set up in the permeability cell on 2/24/2011.

Reviewed by:

Date: 3/3/11





# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-44A-1-11

ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE : 3/3/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 2/01/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S44A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 26-1, Cast 1/28/2011  
Sample Type: 3x6 cylinder

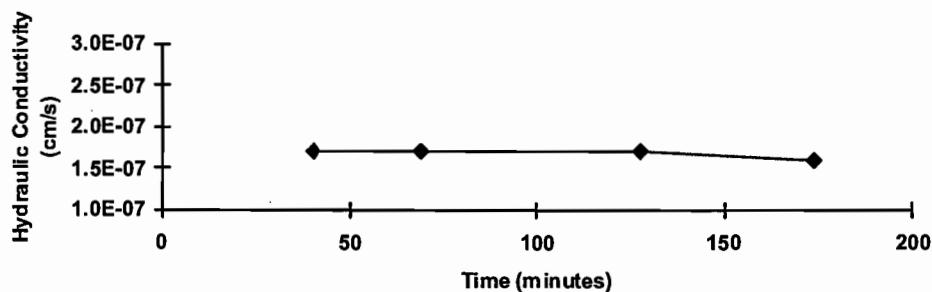
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	2.049	Weight (lbs):	2.073	Permeant Liquid:	Water
Sample Length (in):	4.528	Sample Length (in):	4.528	Test Method:	C
Sample Diameter (in):	3.004	Sample Diameter (in):	3.004	Saturation (%):	98
Area (in <sup>2</sup> ):	7.087	Area (in <sup>2</sup> ):	7.087	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	32.09	Volume (in <sup>3</sup> ):	32.09	Optimum Moisture Content (%):	N/A
Moisture Content (%):	40.5	Moisture Content (%):	42.2		
Dry Unit Weight (pcf):	78.6	Dry Unit Weight (pcf):	78.6		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	1.7 x 10 <sup>-7</sup>

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 27 days when it was set up in the permeability cell on 2/24/2011.

Reviewed by:

Date:

3/3/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-45A-1-11 ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE : 3/3/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 2/01/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S45A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 33-5, Cast 1/30/2011  
Sample Type: 3x6 cylinder

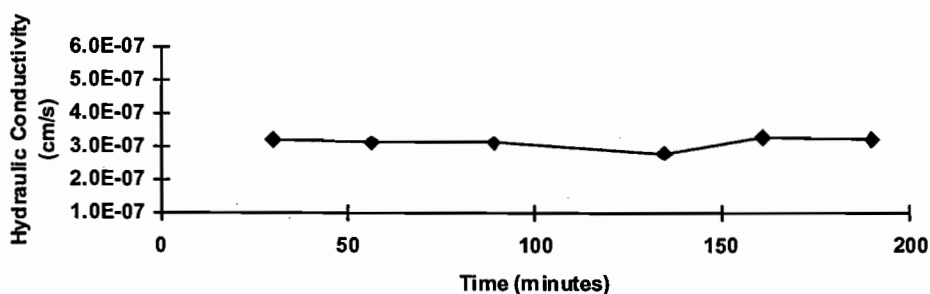
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	1.927	Weight (lbs):	1.948	Permeant Liquid:	Water.
Sample Length (in):	4.252	Sample Length (in):	4.252	Test Method:	C
Sample Diameter (in):	3.004	Sample Diameter (in):	3.004	Saturation (%):	96
Area (in <sup>2</sup> ):	7.087	Area (in <sup>2</sup> ):	7.087	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	30.13	Volume (in <sup>3</sup> ):	30.13	Optimum Moisture Content (%):	N/A
Moisture Content (%):	40.2	Moisture Content (%):	41.7		
Dry Unit Weight (pcf):	78.8	Dry Unit Weight (pcf):	78.8		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$3.1 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 31 days when it was set up in the permeability cell on 2/24/2011.

Reviewed by:

Date:

3/3/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-27A-1-11 ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE: 1/19/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 1/11/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S27A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 45-9, Cast 1/7/11  
Sample Type: 3x6 cylinder

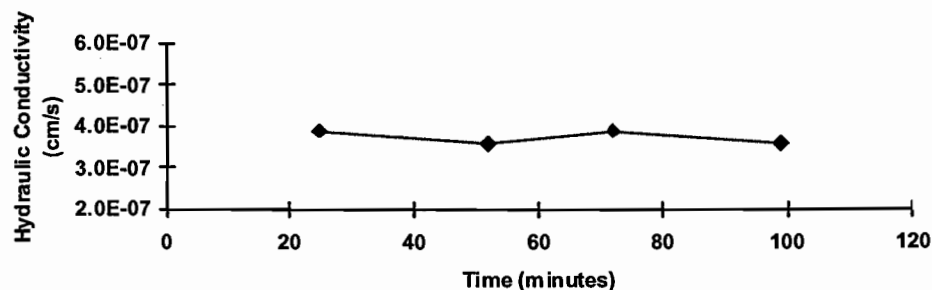
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	2.175	Weight (lbs):	2.191	Permeant Liquid:	Water
Sample Length (in):	4.921	Sample Length (in):	4.921	Test Method:	C
Sample Diameter (in):	2.996	Sample Diameter (in):	2.996	Saturation (%):	96
Area (in <sup>2</sup> ):	7.050	Area (in <sup>2</sup> ):	7.050	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	34.69	Volume (in <sup>3</sup> ):	34.69	Optimum Moisture Content (%):	N/A
Moisture Content (%):	46.6	Moisture Content (%):	47.7		
Dry Unit Weight (pcf):	73.9	Dry Unit Weight (pcf):	73.9		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$3.8 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 7 days when it was set up in the permeability cell on 1/14/2011.

Reviewed by: \_\_\_\_\_

Date: \_\_\_\_\_

1/19/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-28A-1-11 ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE : 1/19/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 1/11/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S28A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 49-9, Cast 1/7/11  
Sample Type: 3x6 cylinder

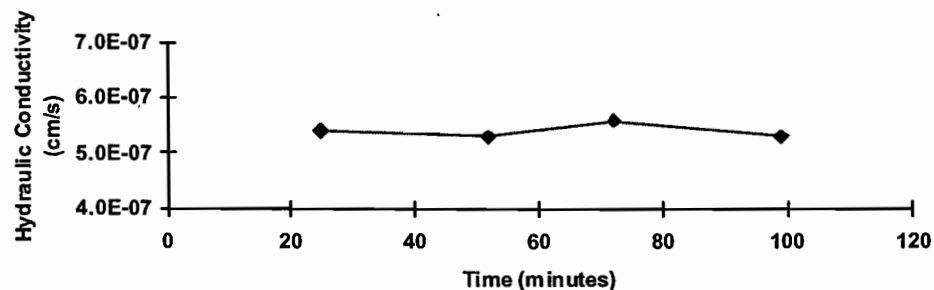
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	2.277	Weight (lbs):	2.297	Permeant Liquid:	Water
Sample Length (in):	5.118	Sample Length (in):	5.118	Test Method:	C
Sample Diameter (in):	2.992	Sample Diameter (in):	2.992	Saturation (%):	97
Area (in <sup>2</sup> ):	7.031	Area (in <sup>2</sup> ):	7.031	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	35.98	Volume (in <sup>3</sup> ):	35.98	Optimum Moisture Content (%):	N/A
Moisture Content (%):	46.2	Moisture Content (%):	47.5		
Dry Unit Weight (pcf):	75.4	Dry Unit Weight (pcf):	74.8		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$5.4 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 7 days when it was set up in the permeability cell on 1/14/2011.

Reviewed by: \_\_\_\_\_

Date: \_\_\_\_\_

1/19/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-29A-1-11 ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE: 1/19/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 1/11/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S29A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 49-5, Cast 1/8/11  
Sample Type: 3x6 cylinder

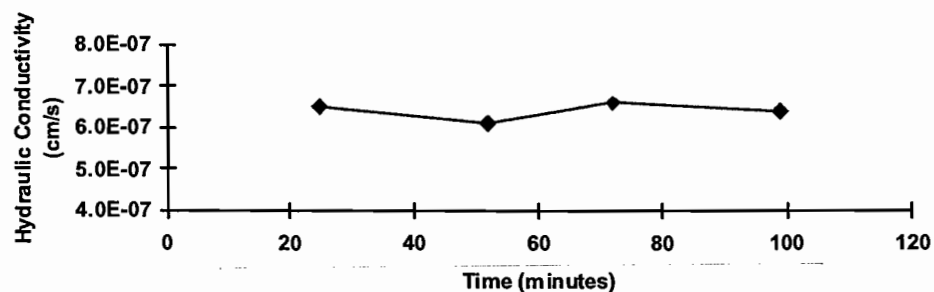
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	2.298	Weight (lbs):	2.315	Permeant Liquid:	Water
Sample Length (in):	5.118	Sample Length (in):	5.118	Test Method:	C
Sample Diameter (in):	2.996	Sample Diameter (in):	2.996	Saturation (%):	97
Area (in <sup>2</sup> ):	7.050	Area (in <sup>2</sup> ):	7.050	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	36.08	Volume (in <sup>3</sup> ):	36.08	Optimum Moisture Content (%):	N/A
Moisture Content (%):	44.6	Moisture Content (%):	45.6		
Dry Unit Weight (pcf):	76.1	Dry Unit Weight (pcf):	76.2		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$6.4 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 6 days when it was set up in the permeability cell on 1/14/2011.

Reviewed by:

Date:

1/19/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-46A-2-11 ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE: 3/11/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 2/10/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S46A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 32-4, Cast 1/31/2011  
Sample Type: 3x6 cylinder

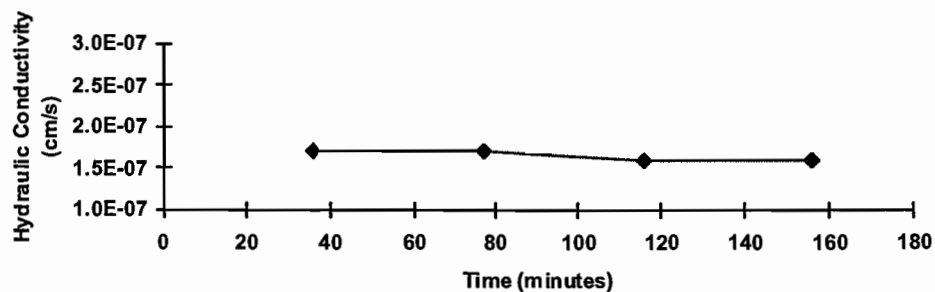
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	1.986	Weight (lbs):	2.010	Permeant Liquid:	Water
Sample Length (in):	4.331	Sample Length (in):	4.331	Test Method:	C
Sample Diameter (in):	3.004	Sample Diameter (in):	3.004	Saturation (%):	98
Area (in <sup>2</sup> ):	7.087	Area (in <sup>2</sup> ):	7.087	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	30.69	Volume (in <sup>3</sup> ):	30.69	Optimum Moisture Content (%):	N/A
Moisture Content (%):	35.5	Moisture Content (%):	37.1		
Dry Unit Weight (pcf):	82.5	Dry Unit Weight (pcf):	82.5		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
66	55	57	9	11	2	$1.7 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 31 days when it was set up in the permeability cell on 3/3/2011.

Reviewed by:

Date:

3/11/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-47A-2-11

ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE: 3/11/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 2/15/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S47A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 30-9, Cast 2/1/2011  
Sample Type: 3x6 cylinder

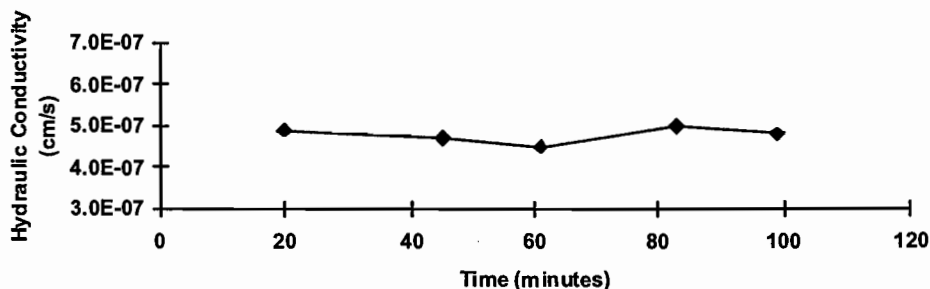
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	1.888	Weight (lbs):	1.906	Permeant Liquid:	Water
Sample Length (in):	4.173	Sample Length (in):	4.173	Test Method:	C
Sample Diameter (in):	3.004	Sample Diameter (in):	3.004	Saturation (%):	98
Area (in <sup>2</sup> ):	7.087	Area (in <sup>2</sup> ):	7.087	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	29.57	Volume (in <sup>3</sup> ):	29.57	Optimum Moisture Content (%):	N/A
Moisture Content (%):	39.1	Moisture Content (%):	40.4		
Dry Unit Weight (pcf):	79.3	Dry Unit Weight (pcf):	79.3		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
66	55	57	9	11	2	$4.8 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 28 days when it was set up in the permeability cell on 3/3/2011.

Reviewed by:

Date:

3/11/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-48A-2-11

ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE : 3/11/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 2/15/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S48A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 29-6, Cast 2/2/2011  
Sample Type: 3x6 cylinder

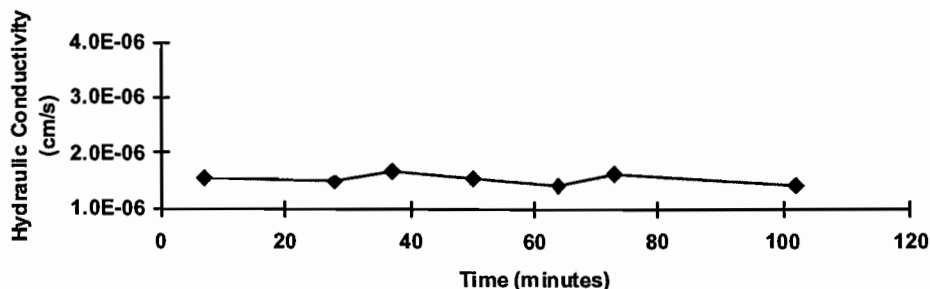
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	1.855	Weight (lbs):	1.886	Permeant Liquid:	Water
Sample Length (in):	4.331	Sample Length (in):	4.331	Test Method:	C
Sample Diameter (in):	3.004	Sample Diameter (in):	3.004	Saturation (%):	96
Area (in <sup>2</sup> ):	7.087	Area (in <sup>2</sup> ):	7.087	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	30.69	Volume (in <sup>3</sup> ):	30.69	Optimum Moisture Content (%):	N/A
Moisture Content (%):	43.8	Moisture Content (%):	46.2		
Dry Unit Weight (pcf):	72.7	Dry Unit Weight (pcf):	72.6		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
66	55	57	9	11	2	1.5 x 10 <sup>-6</sup>

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 29 days when it was set up in the permeability cell on 3/3/2011.

Reviewed by:

Date:

3/11/11





# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-49A-2-11 ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE : 3/11/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 2/15/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S49A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 28-4, Cast 2/3/2011  
Sample Type: 3x6 cylinder

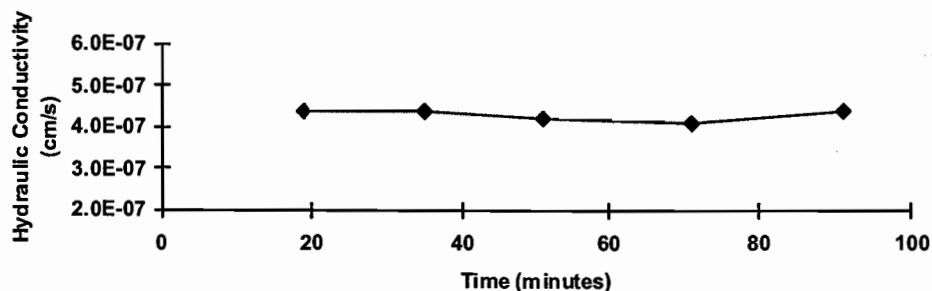
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	1.950	Weight (lbs):	1.983	Permeant Liquid:	Water
Sample Length (in):	4.409	Sample Length (in):	4.409	Test Method:	C
Sample Diameter (in):	3.004	Sample Diameter (in):	3.004	Saturation (%):	98
Area (in <sup>2</sup> ):	7.087	Area (in <sup>2</sup> ):	7.087	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	31.25	Volume (in <sup>3</sup> ):	31.25	Optimum Moisture Content (%):	N/A
Moisture Content (%):	40.6	Moisture Content (%):	42.9		
Dry Unit Weight (pcf):	76.7	Dry Unit Weight (pcf):	76.7		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$4.3 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 33 days when it was set up in the permeability cell on 3/8/2011.

Reviewed by: \_\_\_\_\_

Date: \_\_\_\_\_

3/11/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-50A-2-11

ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE: 3/11/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 2/15/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S50A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 26-9, Cast 2/4/2011  
Sample Type: 3x6 cylinder

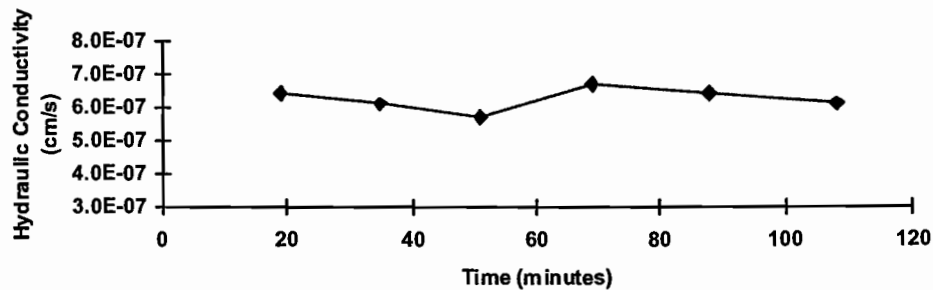
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	1.943	Weight (lbs):	1.971	Permeant Liquid:	Water
Sample Length (in):	4.488	Sample Length (in):	4.488	Test Method:	C
Sample Diameter (in):	3.004	Sample Diameter (in):	3.004	Saturation (%):	98
Area (in <sup>2</sup> ):	7.087	Area (in <sup>2</sup> ):	7.087	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	31.81	Volume (in <sup>3</sup> ):	31.81	Optimum Moisture Content (%):	N/A
Moisture Content (%):	42.0	Moisture Content (%):	44.0		
Dry Unit Weight (pcf):	74.4	Dry Unit Weight (pcf):	74.4		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$6.2 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 32 days when it was set up in the permeability cell on 3/8/2011.

Reviewed by:

Date:

3/11/11



# ATLANTIC TESTING LABORATORIES

**Albany**  
22 Corporate Drive  
Clifton Park, NY 12065  
518-383-9144 (T)  
518-383-9166 (F)

## TRANSMITTAL

March 17, 2011

AECOM  
40 British American Boulevard  
Latham, New York 12110

Attn: Mr. Scott Serviss

E/Mail: [scott.serviss@aecom.com](mailto:scott.serviss@aecom.com)

Re: Soil Laboratory Testing  
NGP Site  
Norwich, New York  
ATL Project No.: AT1573

Dear Mr. Serviss:

Enclosed are the following reports:

AT1573SL-51A-2-11	Hydraulic Conductivity	February 17, 2011
AT1573SL-52A-2-11	Hydraulic Conductivity	February 17, 2011
AT1573SL-53A-2-11	Hydraulic Conductivity	February 23, 2011

Please contact our office should you have any questions or if we may be of further service.

Sincerely,  
*ATLANTIC TESTING LABORATORIES, Limited*

Robert E. Field  
Laboratory Manager  
[bfield@atlantictesting.com](mailto:bfield@atlantictesting.com)

REF/nd

Enclosures



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-51A-2-11

ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE : 3/17/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 2/17/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S51A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 22-3, Cast 2/7/2011  
Sample Type: 3x6 cylinder

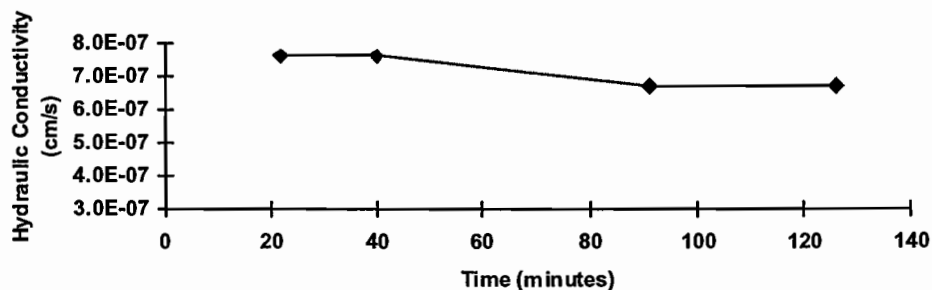
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	2.028	Weight (lbs):	2.061	Permeant Liquid:	Water
Sample Length (in):	4.646	Sample Length (in):	4.646	Test Method:	C
Sample Diameter (in):	3.004	Sample Diameter (in):	3.004	Saturation (%):	96
Area (in <sup>2</sup> ):	7.087	Area (in <sup>2</sup> ):	7.087	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	32.93	Volume (in <sup>3</sup> ):	32.93	Optimum Moisture Content (%):	N/A
Moisture Content (%):	43.6	Moisture Content (%):	46		
Dry Unit Weight (pcf):	74.1	Dry Unit Weight (pcf):	74.1		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$7.2 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 31 days when it was set up in the permeability cell on 3/10/2011.

Reviewed by:

Date:

3/17/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-52A-2-11 ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE : 3/17/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 2/17/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S52A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 23-1, Cast 2/7/2011  
Sample Type: 3x6 cylinder

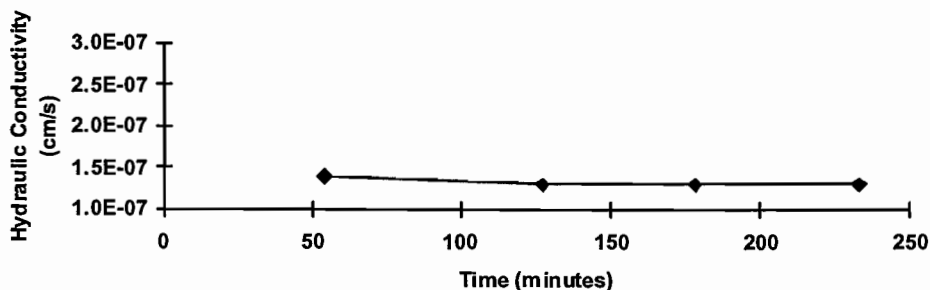
### SAMPLE INFORMATION

INITIAL	FINAL	PARAMETERS
Weight (lbs): 2.023	Weight (lbs): 2.054	Permeant Liquid: Water
Sample Length (in): 4.488	Sample Length (in): 4.488	Test Method: C
Sample Diameter (in): 3.004	Sample Diameter (in): 3.004	Saturation (%): 98
Area (in <sup>2</sup> ): 7.087	Area (in <sup>2</sup> ): 7.087	Maximum Dry Density (pcf): N/A
Volume (in <sup>3</sup> ): 31.81	Volume (in <sup>3</sup> ): 31.81	Optimum Moisture Content (%): N/A
Moisture Content (%): 39.0	Moisture Content (%): 41.2	
Dry Unit Weight (pcf): 79.1	Dry Unit Weight (pcf): 79.1	

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$1.3 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 31 days when it was set up in the permeability cell on 3/10/2011.

Reviewed by:

Date:

3/17/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-53A-2-11 ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE : 3/17/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 2/23/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S53A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 20-4, Cast 2/8/2011  
Sample Type: 3x6 cylinder

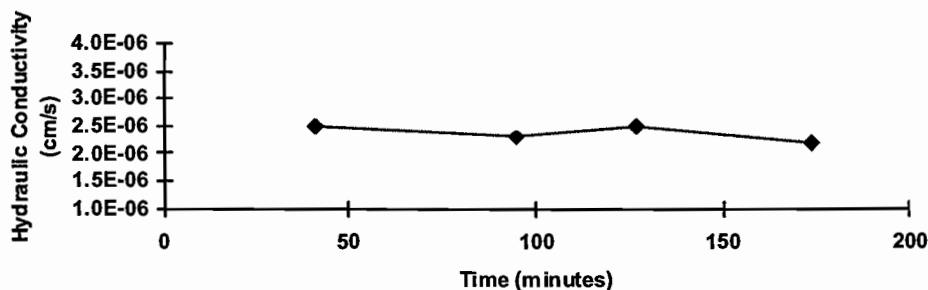
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	1.913	Weight (lbs):	1.937	Permeant Liquid:	Water
Sample Length (in):	4.449	Sample Length (in):	4.449	Test Method:	C
Sample Diameter (in):	3.004	Sample Diameter (in):	3.004	Saturation (%):	96
Area (in <sup>2</sup> ):	7.087	Area (in <sup>2</sup> ):	7.087	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	31.53	Volume (in <sup>3</sup> ):	31.53	Optimum Moisture Content (%):	N/A
Moisture Content (%):	49.4	Moisture Content (%):	51.2		
Dry Unit Weight (pcf):	70.2	Dry Unit Weight (pcf):	70.2		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$2.4 \times 10^{-6}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 30 days when it was set up in the permeability cell on 3/10/2011.

Reviewed by: \_\_\_\_\_

Date: \_\_\_\_\_

3/17/11



# ATLANTIC TESTING LABORATORIES

**Albany**  
22 Corporate Drive  
Clifton Park, NY 12065  
518-383-9144 (T)  
518-383-9166 (F)

## TRANSMITTAL

March 24, 2011

AECOM  
40 British American Boulevard  
Latham, New York 12110

Attn: Mr. Scott Serviss

E/Mail: [scott.serviss@aecom.com](mailto:scott.serviss@aecom.com)

Re: Soil Laboratory Testing  
NGP Site  
Norwich, New York  
ATL Project No.: AT1573

Dear Mr. Serviss:

Enclosed are the following reports:

AT1573SL-54A-2-11	Hydraulic Conductivity	February 23, 2011
AT1573SL-55A-2-11	Hydraulic Conductivity	February 23, 2011
AT1573SL-56A-2-11	Hydraulic Conductivity	February 23, 2011
AT1573SL-57A-2-11	Hydraulic Conductivity	February 23, 2011
AT1573SL-58A-2-11	Hydraulic Conductivity	March 2, 2011
AT1573SL-59A-2-11	Hydraulic Conductivity	March 2, 2011

Please contact our office should you have any questions or if we may be of further service.

Sincerely,  
ATLANTIC TESTING LABORATORIES, Limited

Robert E. Field  
Laboratory Manager  
[bfield@atlantictesting.com](mailto:bfield@atlantictesting.com)

REF/nd

Enclosures



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-54A-2-11 ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE : 3/24/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 2/23/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S54A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 15-1, Cast 2/9/2011  
Sample Type: 3x6 cylinder

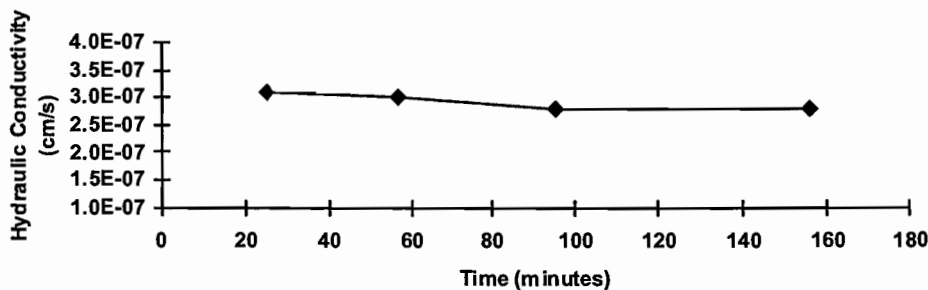
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	2.043	Weight (lbs):	2.068	Permeant Liquid:	Water
Sample Length (in):	4.764	Sample Length (in):	4.764	Test Method:	C
Sample Diameter (in):	3.004	Sample Diameter (in):	3.004	Saturation (%):	98
Area (in <sup>2</sup> ):	7.087	Area (in <sup>2</sup> ):	7.087	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	33.76	Volume (in <sup>3</sup> ):	33.76	Optimum Moisture Content (%):	N/A
Moisture Content (%):	51.2	Moisture Content (%):	53.1		
Dry Unit Weight (pcf):	69.2	Dry Unit Weight (pcf):	69.2		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$2.9 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 36 days when it was set up in the permeability cell on 3/17/2011.

Reviewed by:

Date:

3/24/11





# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-55A-2-11 ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE: 3/24/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 2/23/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S55A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 14-4, Cast 2/10/2011  
Sample Type: 3x6 cylinder

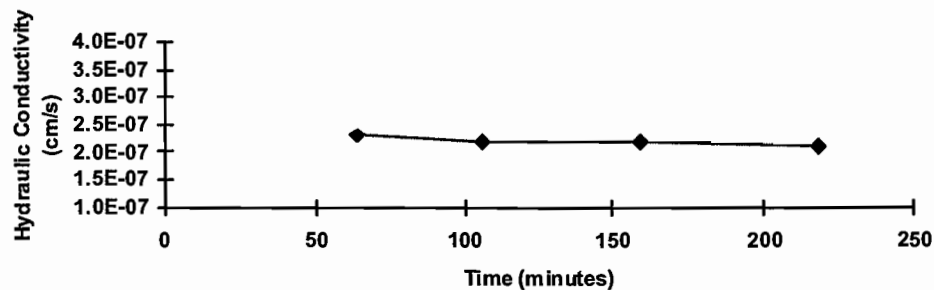
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	2.162	Weight (lbs):	2.193	Permeant Liquid:	Water
Sample Length (in):	4.843	Sample Length (in):	4.843	Test Method:	C
Sample Diameter (in):	3.004	Sample Diameter (in):	3.004	Saturation (%):	98
Area (in <sup>2</sup> ):	7.087	Area (in <sup>2</sup> ):	7.087	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	34.32	Volume (in <sup>3</sup> ):	34.32	Optimum Moisture Content (%):	N/A
Moisture Content (%):	39.5	Moisture Content (%):	41.6		
Dry Unit Weight (pcf):	78.0	Dry Unit Weight (pcf):	77.9		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$2.2 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 35 days when it was set up in the permeability cell on 3/17/2011.

Reviewed by:

Date:

3/24/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-56A-2-11 ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE : 3/24/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 2/23/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S56A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 13-3, Cast 2/11/2011  
Sample Type: 3x6 cylinder

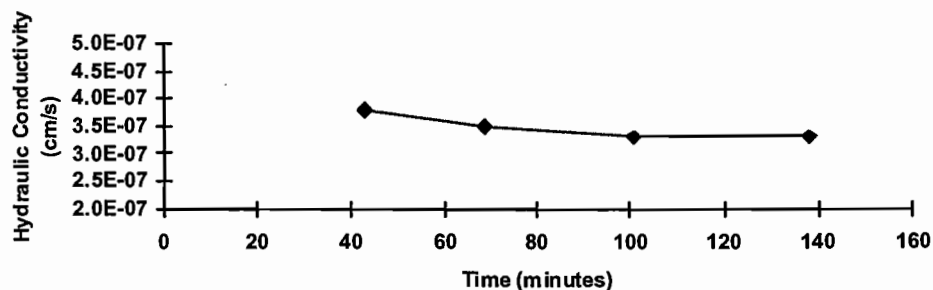
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	2.066	Weight (lbs):	2.093	Permeant Liquid:	Water
Sample Length (in):	4.646	Sample Length (in):	4.646	Test Method:	C
Sample Diameter (in):	3.004	Sample Diameter (in):	3.004	Saturation (%):	96
Area (in <sup>2</sup> ):	7.087	Area (in <sup>2</sup> ):	7.087	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	32.93	Volume (in <sup>3</sup> ):	32.93	Optimum Moisture Content (%):	N/A
Moisture Content (%):	42.5	Moisture Content (%):	44.3		
Dry Unit Weight (pcf):	76.1	Dry Unit Weight (pcf):	76.2		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$3.5 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 34 days when it was set up in the permeability cell on 3/17/2011.

Reviewed by: \_\_\_\_\_

Date: \_\_\_\_\_

3/24/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-57A-2-11 ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE: 3/24/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 2/23/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S57A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 8-3, Cast 2/12/2011  
Sample Type: 3x6 cylinder

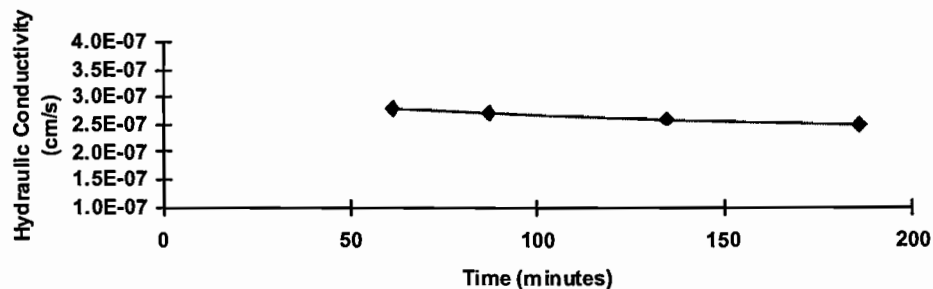
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	2.150	Weight (lbs):	2.179	Permeant Liquid:	Water
Sample Length (in):	4.764	Sample Length (in):	4.764	Test Method:	C
Sample Diameter (in):	3.004	Sample Diameter (in):	3.004	Saturation (%):	98
Area (in <sup>2</sup> ):	7.087	Area (in <sup>2</sup> ):	7.087	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	33.76	Volume (in <sup>3</sup> ):	33.76	Optimum Moisture Content (%):	N/A
Moisture Content (%):	39.6	Moisture Content (%):	41.5		
Dry Unit Weight (pcf):	78.9	Dry Unit Weight (pcf):	78.9		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$2.7 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 33 days when it was set up in the permeability cell on 3/17/2011.

Reviewed by:

Date:

3/24/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-58A-2-11 ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE: 3/24/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 3/2/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S58A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 24-6, Cast 2/14/2011  
Sample Type: 3x6 cylinder

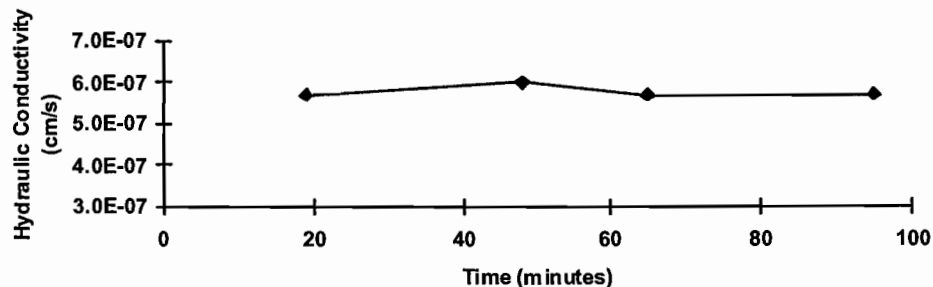
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	1.898	Weight (lbs):	1.923	Permeant Liquid:	Water
Sample Length (in):	4.449	Sample Length (in):	4.449	Test Method:	C
Sample Diameter (in):	3.004	Sample Diameter (in):	3.004	Saturation (%):	96
Area (in <sup>2</sup> ):	7.087	Area (in <sup>2</sup> ):	7.087	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	31.53	Volume (in <sup>3</sup> ):	31.53	Optimum Moisture Content (%):	N/A
Moisture Content (%):	50.7	Moisture Content (%):	52.7		
Dry Unit Weight (pcf):	69.0	Dry Unit Weight (pcf):	69.0		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$5.8 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 31 days when it was set up in the permeability cell on 3/17/2011.

Reviewed by: \_\_\_\_\_

Date: \_\_\_\_\_

4/23/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-59A-2-11 ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE : 3/24/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 3/2/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S59A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 22-9, Cast 2/15/2011  
Sample Type: 3x6 cylinder

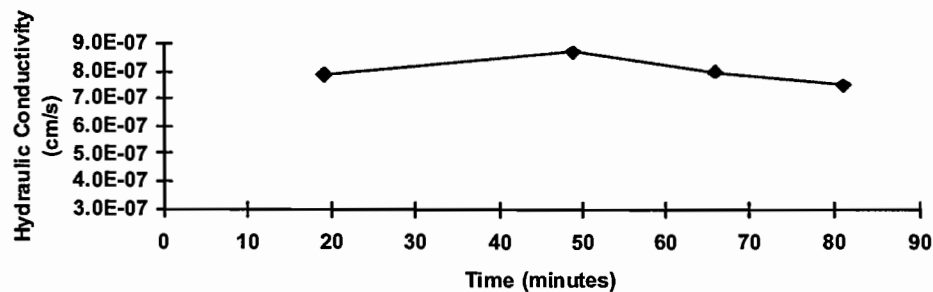
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	2.008	Weight (lbs):	2.038	Permeant Liquid:	Water
Sample Length (in):	4.370	Sample Length (in):	4.370	Test Method:	C
Sample Diameter (in):	3.004	Sample Diameter (in):	3.004	Saturation (%):	96
Area (in <sup>2</sup> ):	7.087	Area (in <sup>2</sup> ):	7.087	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	30.97	Volume (in <sup>3</sup> ):	30.97	Optimum Moisture Content (%):	N/A
Moisture Content (%):	35.4	Moisture Content (%):	37.4		
Dry Unit Weight (pcf):	82.7	Dry Unit Weight (pcf):	82.8		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$8.0 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 30 days when it was set up in the permeability cell on 3/17/2011.

Reviewed by:

Date:

3/24/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-60A-3-11 ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE: 4/4/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 3/2/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S60A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 20-10, Cast 2/16/2011  
Sample Type: 3x6 cylinder

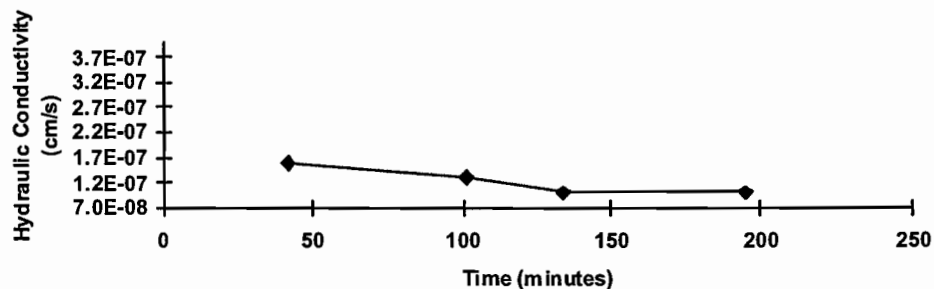
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	1.953	Weight (lbs):	1.989	Permeant Liquid:	Water
Sample Length (in):	4.528	Sample Length (in):	4.528	Test Method:	C
Sample Diameter (in):	3.004	Sample Diameter (in):	3.004	Saturation (%):	98
Area (in <sup>2</sup> ):	7.087	Area (in <sup>2</sup> ):	7.087	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	32.09	Volume (in <sup>3</sup> ):	32.09	Optimum Moisture Content (%):	N/A
Moisture Content (%):	45.8	Moisture Content (%):	48.5		
Dry Unit Weight (pcf):	72.1	Dry Unit Weight (pcf):	72.2		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$1.2 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 35 days when it was set up in the permeability cell on 3/23/2011.

Reviewed by: \_\_\_\_\_

Date: \_\_\_\_\_

4/4/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-61A-2-11 ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE : 4/4/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 3/2/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S61A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 18-9, Cast 2/16/2011  
Sample Type: 3x6 cylinder

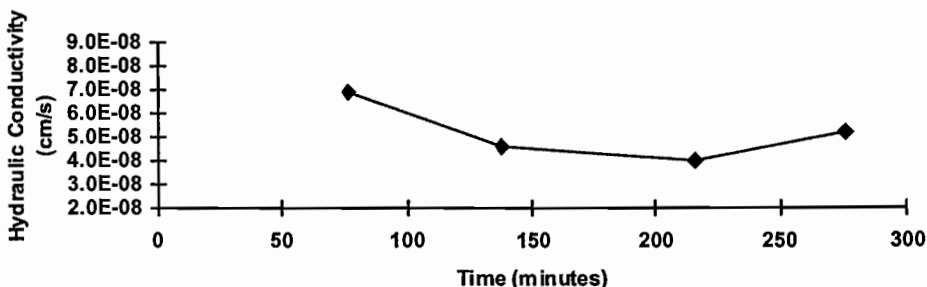
### SAMPLE INFORMATION

INITIAL	FINAL	PARAMETERS
Weight (lbs): 2.095	Weight (lbs): 2.128	Permeant Liquid: Water
Sample Length (in): 4.764	Sample Length (in): 4.764	Test Method: C
Sample Diameter (in): 3.004	Sample Diameter (in): 3.004	Saturation (%): 98
Area (in <sup>2</sup> ): 7.087	Area (in <sup>2</sup> ): 7.087	Maximum Dry Density (pcf): N/A
Volume (in <sup>3</sup> ): 33.76	Volume (in <sup>3</sup> ): 33.76	Optimum Moisture Content (%): N/A
Moisture Content (%): 42.1	Moisture Content (%): 44.3	
Dry Unit Weight (pcf): 75.5	Dry Unit Weight (pcf): 75.5	

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	5.2 x 10 <sup>-8</sup>

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 35 days when it was set up in the permeability cell on 3/23/2011.

Reviewed by:

Date:

4/4/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-62A-2-11

ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE : 4/4/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 3/2/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S62A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 16-10, Cast 2/17/2011  
Sample Type: 3x6 cylinder

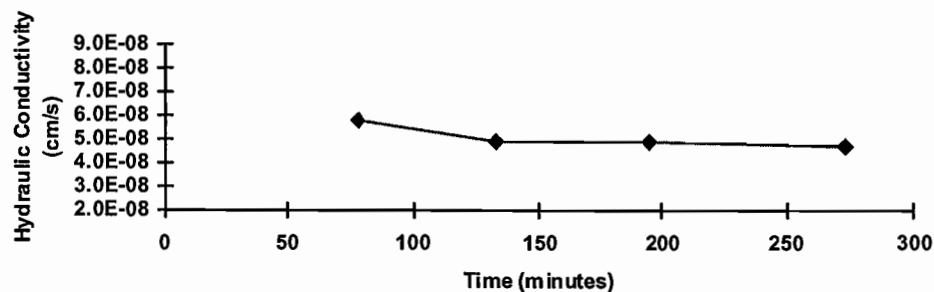
### SAMPLE INFORMATION

INITIAL	FINAL	PARAMETERS
Weight (lbs): 2.090	Weight (lbs): 2.123	Permeant Liquid: Water
Sample Length (in): 4.606	Sample Length (in): 4.606	Test Method: C
Sample Diameter (in): 3.004	Sample Diameter (in): 3.004	Saturation (%): 98
Area (in <sup>2</sup> ): 7.087	Area (in <sup>2</sup> ): 7.087	Maximum Dry Density (pcf): N/A
Volume (in <sup>3</sup> ): 32.64	Volume (in <sup>3</sup> ): 32.64	Optimum Moisture Content (%): N/A
Moisture Content (%): 36.8	Moisture Content (%): 38.9	
Dry Unit Weight (pcf): 80.9	Dry Unit Weight (pcf): 80.9	

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$5.1 \times 10^{-8}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 34 days when it was set up in the permeability cell on 3/23/2011.

Reviewed by:

Date: 4/4/11





# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-63A-2-11 ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE : 4/4/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 3/2/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S63A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 15-9, Cast 2/18/2011  
Sample Type: 3x6 cylinder

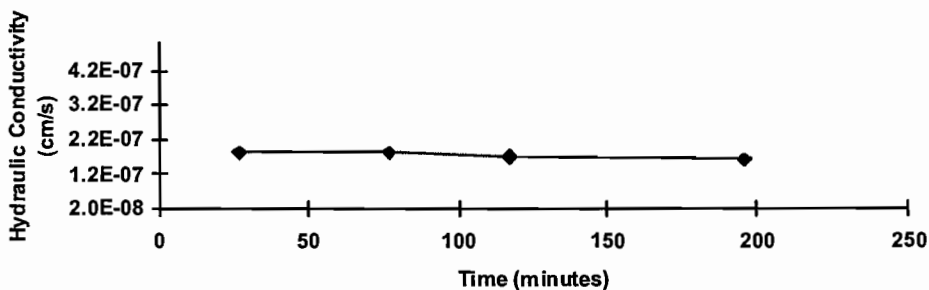
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	2.042	Weight (lbs):	2.078	Permeant Liquid:	Water
Sample Length (in):	4.567	Sample Length (in):	4.567	Test Method:	C
Sample Diameter (in):	3.004	Sample Diameter (in):	3.004	Saturation (%):	98
Area (in <sup>2</sup> ):	7.087	Area (in <sup>2</sup> ):	7.087	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	32.37	Volume (in <sup>3</sup> ):	32.37	Optimum Moisture Content (%):	N/A
Moisture Content (%):	38.4	Moisture Content (%):	40.9		
Dry Unit Weight (pcf):	78.8	Dry Unit Weight (pcf):	78.8		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$1.7 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 33 days when it was set up in the permeability cell on 3/23/2011.

Reviewed by:

Date:

4/4/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-64A-2-11 ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE : 4/4/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 3/2/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S64A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 13-9, Cast 2/18/2011  
Sample Type: 3x6 cylinder

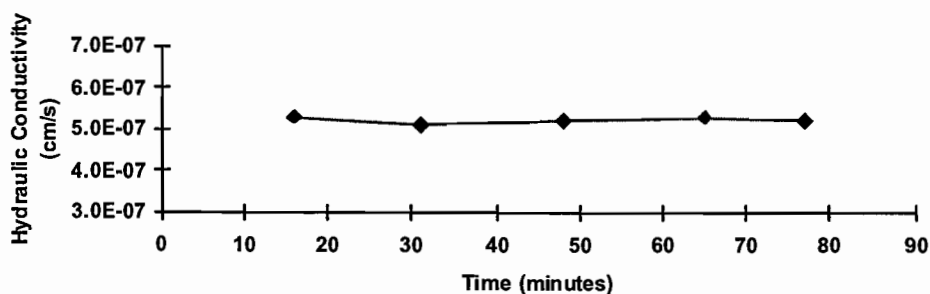
### SAMPLE INFORMATION

INITIAL	FINAL	PARAMETERS
Weight (lbs): 1.904	Weight (lbs): 1.929	Permeant Liquid: Water
Sample Length (in): 4.291	Sample Length (in): 4.291	Test Method: C
Sample Diameter (in): 3.004	Sample Diameter (in): 3.004	Saturation (%): 96
Area (in <sup>2</sup> ): 7.087	Area (in <sup>2</sup> ): 7.087	Maximum Dry Density (pcf): N/A
Volume (in <sup>3</sup> ): 30.41	Volume (in <sup>3</sup> ): 30.41	Optimum Moisture Content (%): N/A
Moisture Content (%): 40.1	Moisture Content (%): 41.9	
Dry Unit Weight (pcf): 77.2	Dry Unit Weight (pcf): 77.3	

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$5.2 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 33 days when it was set up in the permeability cell on 3/23/2011.

Reviewed by: \_\_\_\_\_

Date: \_\_\_\_\_

4/4/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-65A-2-11 ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE: 4/4/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 3/2/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S65A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 12-10, Cast 2/19/2011  
Sample Type: 3x6 cylinder

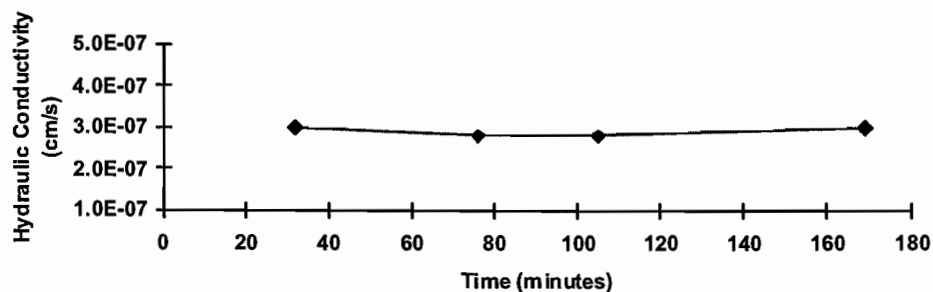
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	2.089	Weight (lbs):	2.122	Permeant Liquid:	Water
Sample Length (in):	4.724	Sample Length (in):	4.724	Test Method:	C
Sample Diameter (in):	3.004	Sample Diameter (in):	3.004	Saturation (%):	98
Area (in <sup>2</sup> ):	7.087	Area (in <sup>2</sup> ):	7.087	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	33.48	Volume (in <sup>3</sup> ):	33.48	Optimum Moisture Content (%):	N/A
Moisture Content (%):	39.4	Moisture Content (%):	41.6		
Dry Unit Weight (pcf):	77.4	Dry Unit Weight (pcf):	77.3		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$2.9 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 32 days when it was set up in the permeability cell on 3/23/2011.

Reviewed by: \_\_\_\_\_

Date: \_\_\_\_\_

4/4/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-66A-3-11

ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE : 4/6/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 3/10/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S66A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 10-5, Cast 2/21/2011  
Sample Type: 3x6 cylinder

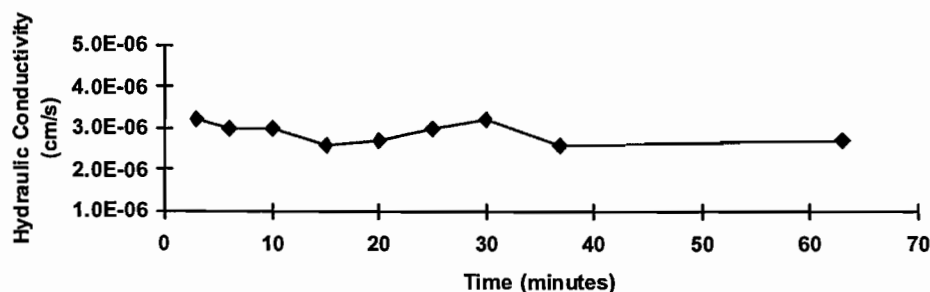
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	2.028	Weight (lbs):	2.063	Permeant Liquid:	Water
Sample Length (in):	4.606	Sample Length (in):	4.606	Test Method:	C
Sample Diameter (in):	3.004	Sample Diameter (in):	3.004	Saturation (%):	98
Area (in <sup>2</sup> ):	7.087	Area (in <sup>2</sup> ):	7.087	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	32.64	Volume (in <sup>3</sup> ):	32.64	Optimum Moisture Content (%):	N/A
Moisture Content (%):	39.5	Moisture Content (%):	42.0		
Dry Unit Weight (pcf):	77.0	Dry Unit Weight (pcf):	76.9		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$2.9 \times 10^{-6}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 39 days when it was set up in the permeability cell on 4/1/2011.

Reviewed by:

Date: 4/6/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-67A-3-11

ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE: 4/6/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 3/10/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S67A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 8-6, Cast 2/21/2011  
Sample Type: 3x6 cylinder

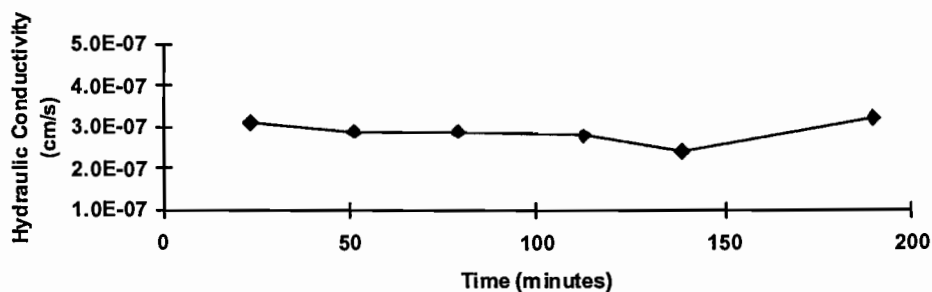
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	2.020	Weight (lbs):	2.047	Permeant Liquid:	Water
Sample Length (in):	4.370	Sample Length (in):	4.370	Test Method:	C
Sample Diameter (in):	3.004	Sample Diameter (in):	3.004	Saturation (%):	98
Area (in <sup>2</sup> ):	7.087	Area (in <sup>2</sup> ):	7.087	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	30.97	Volume (in <sup>3</sup> ):	30.97	Optimum Moisture Content (%):	N/A
Moisture Content (%):	33.8	Moisture Content (%):	35.6		
Dry Unit Weight (pcf):	84.3	Dry Unit Weight (pcf):	84.4		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$2.9 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 39 days when it was set up in the permeability cell on 4/1/2011.

Reviewed by:

Date:

4/6/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-68A-3-11 ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE : 4/6/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 3/10/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S68A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 8-8, Cast 2/22/2011  
Sample Type: 3x6 cylinder

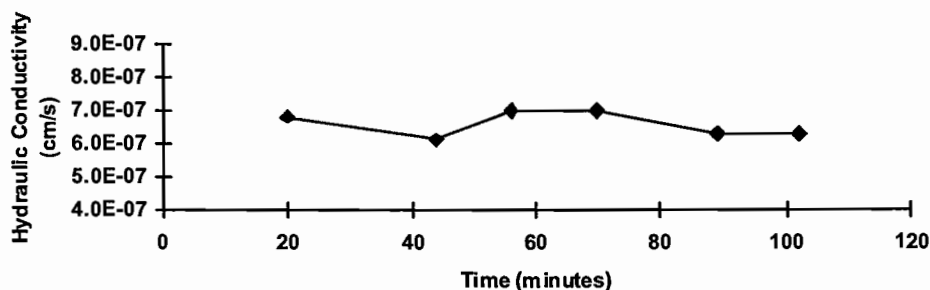
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	1.897	Weight (lbs):	1.919	Permeant Liquid:	Water
Sample Length (in):	4.134	Sample Length (in):	4.134	Test Method:	C
Sample Diameter (in):	3.004	Sample Diameter (in):	3.004	Saturation (%):	98
Area (in <sup>2</sup> ):	7.087	Area (in <sup>2</sup> ):	7.087	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	29.30	Volume (in <sup>3</sup> ):	29.30	Optimum Moisture Content (%):	N/A
Moisture Content (%):	32.6	Moisture Content (%):	34.1		
Dry Unit Weight (pcf):	84.4	Dry Unit Weight (pcf):	84.4		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$6.6 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 38 days when it was set up in the permeability cell on 4/1/2011.

Reviewed by:

Date:

4/6/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-69A-3-11

ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE : 4/6/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 3/10/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S69A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 10-10, Cast 2/23/2011  
Sample Type: 3x6 cylinder

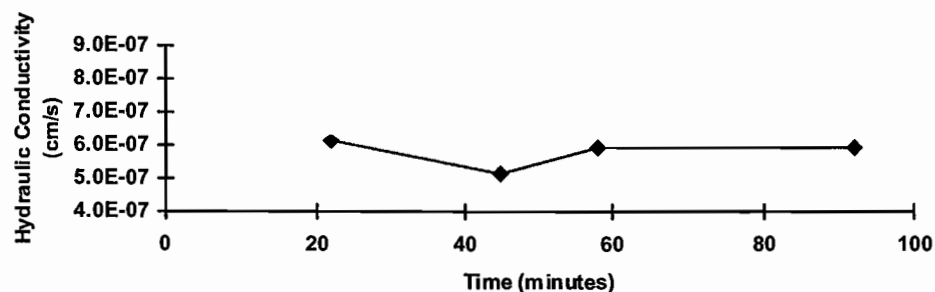
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	1.963	Weight (lbs):	1.987	Permeant Liquid:	Water
Sample Length (in):	4.331	Sample Length (in):	4.331	Test Method:	C
Sample Diameter (in):	3.004	Sample Diameter (in):	3.004	Saturation (%):	98
Area (in <sup>2</sup> ):	7.087	Area (in <sup>2</sup> ):	7.087	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	30.69	Volume (in <sup>3</sup> ):	30.69	Optimum Moisture Content (%):	N/A
Moisture Content (%):	37.6	Moisture Content (%):	39.3		
Dry Unit Weight (pcf):	80.3	Dry Unit Weight (pcf):	80.3		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$5.8 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 37 days when it was set up in the permeability cell on 4/1/2011.

Reviewed by:

Date:

4/6/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-70A-3-11 ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE : 4/6/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 3/10/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S70A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 29-10, Cast 2/24/2011  
Sample Type: 3x6 cylinder

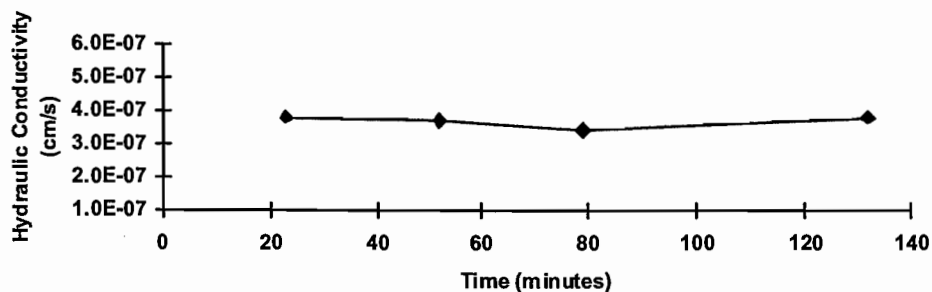
### SAMPLE INFORMATION

INITIAL	FINAL	PARAMETERS
Weight (lbs): 1.926	Weight (lbs): 1.947	Permeant Liquid: Water
Sample Length (in): 4.331	Sample Length (in): 4.331	Test Method: C
Sample Diameter (in): 3.004	Sample Diameter (in): 3.004	Saturation (%): 98
Area (in <sup>2</sup> ): 7.087	Area (in <sup>2</sup> ): 7.087	Maximum Dry Density (pcf): N/A
Volume (in <sup>3</sup> ): 30.69	Volume (in <sup>3</sup> ): 30.69	Optimum Moisture Content (%): N/A
Moisture Content (%): 38.8	Moisture Content (%): 40.3	
Dry Unit Weight (pcf): 78.1	Dry Unit Weight (pcf): 78.1	

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$3.7 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 36 days when it was set up in the permeability cell on 4/1/2011.

Reviewed by:

Date:

4/6/11





# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-71A-3-11

ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE: 4/6/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 3/10/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S71A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 26-11, Cast 2/26/2011  
Sample Type: 3x6 cylinder

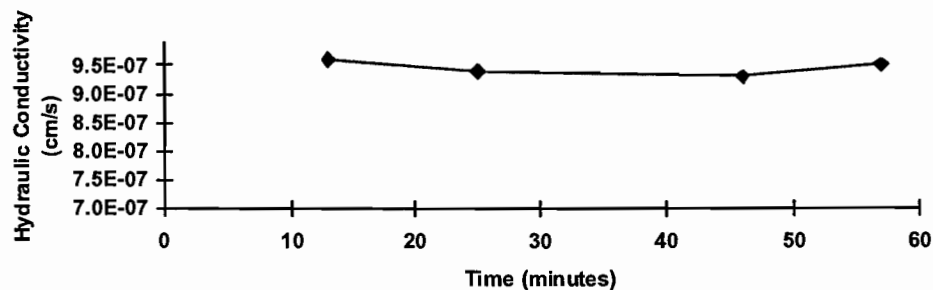
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	1.928	Weight (lbs):	1.945	Permeant Liquid:	Water
Sample Length (in):	4.449	Sample Length (in):	4.449	Test Method:	C
Sample Diameter (in):	3.004	Sample Diameter (in):	3.004	Saturation (%):	98
Area (in <sup>2</sup> ):	7.087	Area (in <sup>2</sup> ):	7.087	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	31.53	Volume (in <sup>3</sup> ):	31.53	Optimum Moisture Content (%):	N/A
Moisture Content (%):	46.8	Moisture Content (%):	48.1		
Dry Unit Weight (pcf):	72.0	Dry Unit Weight (pcf):	72.0		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$9.5 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 34 days when it was set up in the permeability cell on 4/1/2011.

Reviewed by:

Date:

4/6/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-72A-3-11

ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE : 4/13/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 3/16/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S72A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 24-12, Cast 2/28/2011  
Sample Type: 3x6 cylinder

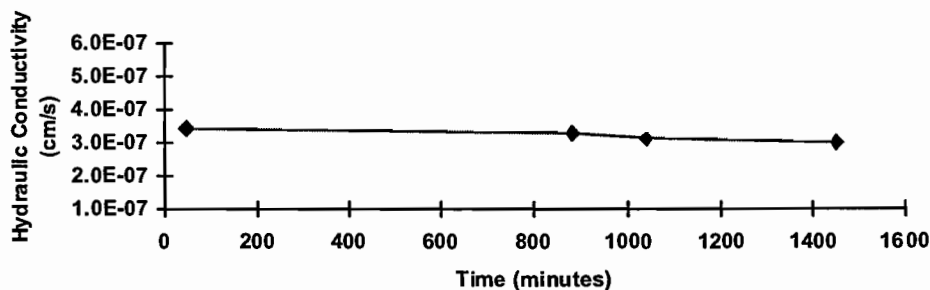
### SAMPLE INFORMATION

INITIAL	FINAL	PARAMETERS
Weight (lbs): 2.360	Weight (lbs): 2.340	Permeant Liquid: Water
Sample Length (in): 5.235	Sample Length (in): 5.235	Test Method: C
Sample Diameter (in): 3.010	Sample Diameter (in): 3.010	Saturation (%): 98
Area (in <sup>2</sup> ): 7.116	Area (in <sup>2</sup> ): 7.116	Maximum Dry Density (pcf): N/A
Volume (in <sup>3</sup> ): 37.25	Volume (in <sup>3</sup> ): 37.25	Optimum Moisture Content (%): N/A
Moisture Content (%): 38.3	Moisture Content (%): 43.7	
Dry Unit Weight (pcf): 79.2	Dry Unit Weight (pcf): 79.2	

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$2.9 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 36 days when it was set up in the permeability cell on 4/5/2011.

Reviewed by:

Date: 4/13/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-77A-3-11 ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE : 4/13/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 3/16/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S77A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 18-16, Cast 3/3/2011  
Sample Type: 3x6 cylinder

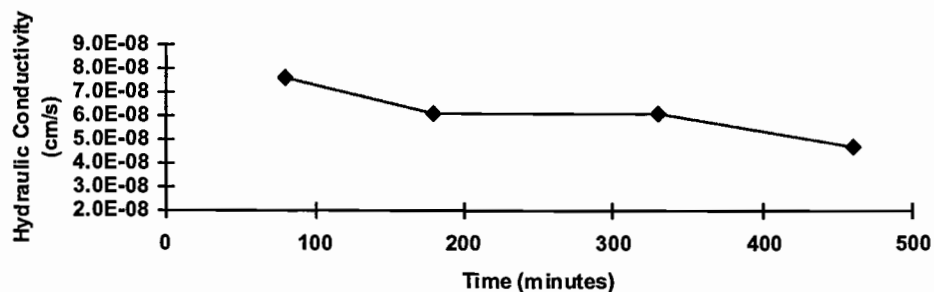
### SAMPLE INFORMATION

INITIAL	FINAL	PARAMETERS
Weight (lbs): 2.010	Weight (lbs): 2.050	Permeant Liquid: Water
Sample Length (in): 4.651	Sample Length (in): 4.651	Test Method: C
Sample Diameter (in): 3.010	Sample Diameter (in): 3.010	Saturation (%): 98
Area (in <sup>2</sup> ): 7.116	Area (in <sup>2</sup> ): 7.116	Maximum Dry Density (pcf): N/A
Volume (in <sup>3</sup> ): 33.10	Volume (in <sup>3</sup> ): 33.10	Optimum Moisture Content (%): N/A
Moisture Content (%): 49.7	Moisture Content (%): 47.1	
Dry Unit Weight (pcf): 70.1	Dry Unit Weight (pcf): 70.1	

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$6.1 \times 10^{-8}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 33 days when it was set up in the permeability cell on 4/5/2011.

Reviewed by:

Date: 4/13/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-78A-3-11 ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE : 4/13/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 3/16/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S78A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 17-15, Cast 3/4/2011  
Sample Type: 3x6 cylinder

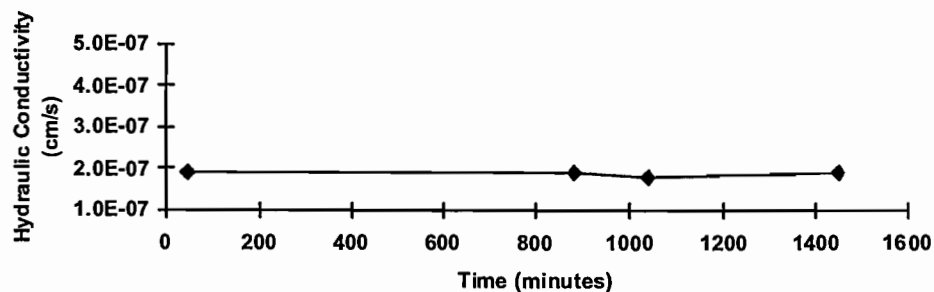
### SAMPLE INFORMATION

INITIAL	FINAL	PARAMETERS
Weight (lbs): 2.120	Weight (lbs): 2.150	Permeant Liquid: Water
Sample Length (in): 4.604	Sample Length (in): 4.604	Test Method: C
Sample Diameter (in): 3.010	Sample Diameter (in): 3.010	Saturation (%): 98
Area (in <sup>2</sup> ): 7.116	Area (in <sup>2</sup> ): 7.116	Maximum Dry Density (pcf): N/A
Volume (in <sup>3</sup> ): 32.75	Volume (in <sup>3</sup> ): 32.75	Optimum Moisture Content (%): N/A
Moisture Content (%): 40.4	Moisture Content (%): 39.1	
Dry Unit Weight (pcf): 79.7	Dry Unit Weight (pcf): 79.7	

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$1.9 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 32 days when it was set up in the permeability cell on 4/5/2011.

Reviewed by: 

Date: 4/13/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-48B-2-11 ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE : 4/8/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 3/24/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S48B (retest)  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 29-6, Cast 2/2/2011  
Sample Type: 3x6 cylinder

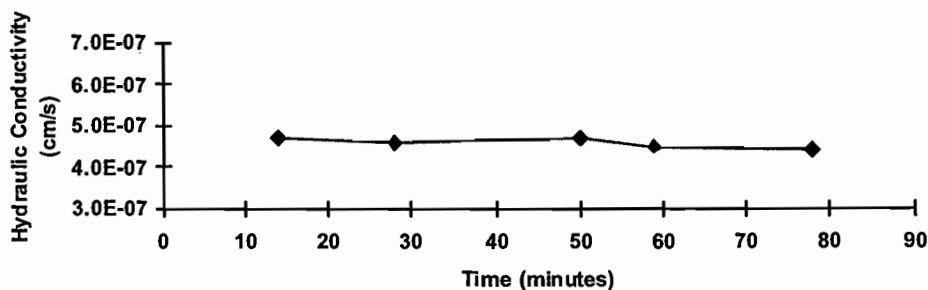
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	1.891	Weight (lbs):	1.922	Permeant Liquid:	Water
Sample Length (in):	4.488	Sample Length (in):	4.488	Test Method:	C
Sample Diameter (in):	3.004	Sample Diameter (in):	3.004	Saturation (%):	98
Area (in <sup>2</sup> ):	7.087	Area (in <sup>2</sup> ):	7.087	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	31.81	Volume (in <sup>3</sup> ):	31.81	Optimum Moisture Content (%):	N/A
Moisture Content (%):	46.8	Moisture Content (%):	49.2		
Dry Unit Weight (pcf):	70.0	Dry Unit Weight (pcf):	70.0		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$4.6 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 61 days when it was set up in the permeability cell on 4/1/2011.

Reviewed by:

Date:

4/8/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-73A-3-11

ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE : 4/8/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 3/16/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S73A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 23-15, Cast 3/1/2011  
Sample Type: 3x6 cylinder

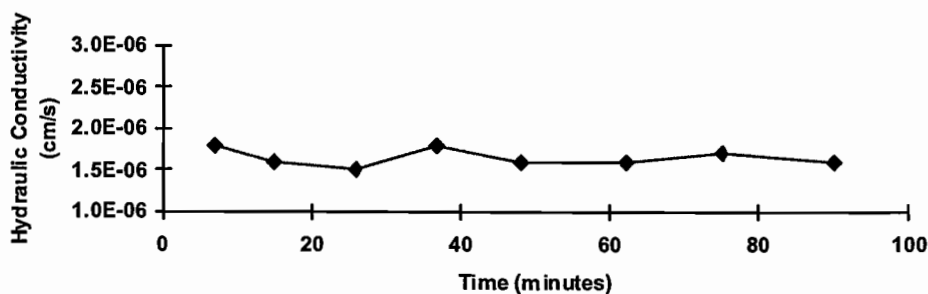
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	1.979	Weight (lbs):	2.007	Permeant Liquid:	Water
Sample Length (in):	4.291	Sample Length (in):	4.291	Test Method:	C
Sample Diameter (in):	3.004	Sample Diameter (in):	3.004	Saturation (%):	98
Area (in <sup>2</sup> ):	7.087	Area (in <sup>2</sup> ):	7.087	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	30.41	Volume (in <sup>3</sup> ):	30.41	Optimum Moisture Content (%):	N/A
Moisture Content (%):	36.2	Moisture Content (%):	38.1		
Dry Unit Weight (pcf):	82.6	Dry Unit Weight (pcf):	82.6		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	1.7 x 10 <sup>-6</sup>

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 34 days when it was set up in the permeability cell on 4/5/2011.

Reviewed by:

Date:

4/8/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-74A-3-11

ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE : 4/8/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 3/16/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S74A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 21-10, Cast 3/1/2011  
Sample Type: 3x6 cylinder

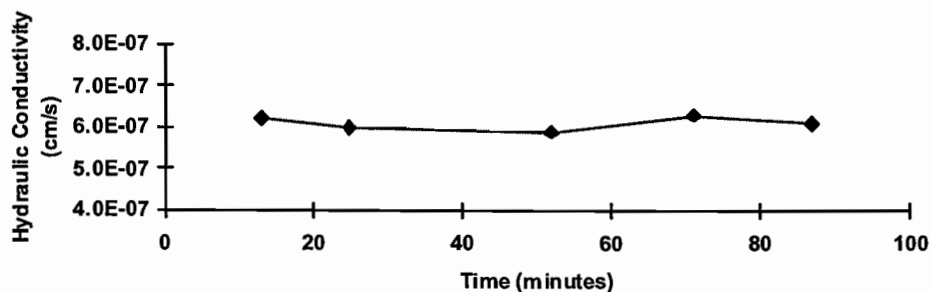
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	1.918	Weight (lbs):	1.942	Permeant Liquid:	Water
Sample Length (in):	4.528	Sample Length (in):	4.528	Test Method:	C
Sample Diameter (in):	3.004	Sample Diameter (in):	3.004	Saturation (%):	98
Area (in <sup>2</sup> ):	7.087	Area (in <sup>2</sup> ):	7.087	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	32.09	Volume (in <sup>3</sup> ):	32.09	Optimum Moisture Content (%):	N/A
Moisture Content (%):	49.7	Moisture Content (%):	51.5		
Dry Unit Weight (pcf):	69.0	Dry Unit Weight (pcf):	69.0		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$6.1 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 34 days when it was set up in the permeability cell on 4/5/2011.

Reviewed by:

Date:

4/8/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-75A-3-11 ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE: 4/8/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 3/16/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S75A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 20-16, Cast 3/2/2011  
Sample Type: 3x6 cylinder

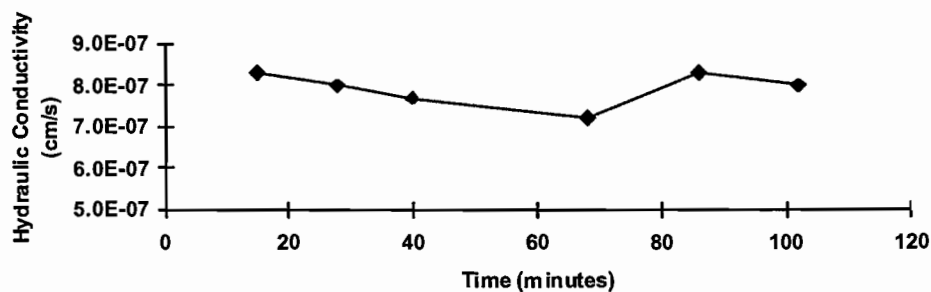
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	2.004	Weight (lbs):	2.029	Permeant Liquid:	Water
Sample Length (in):	4.528	Sample Length (in):	4.528	Test Method:	C
Sample Diameter (in):	3.004	Sample Diameter (in):	3.004	Saturation (%):	98
Area (in <sup>2</sup> ):	7.087	Area (in <sup>2</sup> ):	7.087	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	32.09	Volume (in <sup>3</sup> ):	32.09	Optimum Moisture Content (%):	N/A
Moisture Content (%):	42.2	Moisture Content (%):	44.0		
Dry Unit Weight (pcf):	75.9	Dry Unit Weight (pcf):	75.9		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$7.9 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 33 days when it was set up in the permeability cell on 4/5/2011.

Reviewed by: \_\_\_\_\_

Date: \_\_\_\_\_

4/8/11





# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-76B-3-11

ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE : 4/8/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 3/16/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S76B  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 18-11, Cast 3/2/2011  
Sample Type: 3x6 cylinder

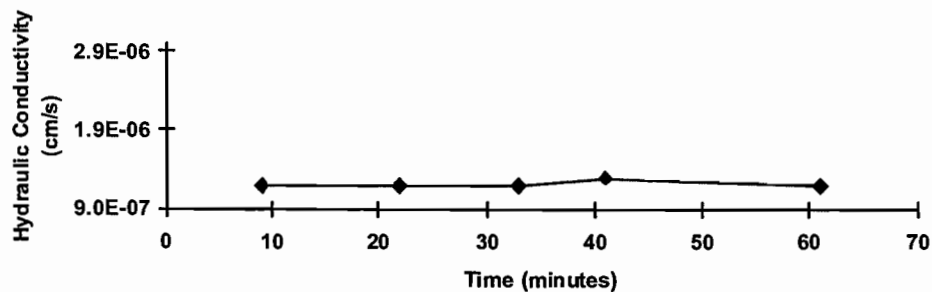
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	1.909	Weight (lbs):	1.929	Permeant Liquid:	Water
Sample Length (in):	4.370	Sample Length (in):	4.370	Test Method:	C
Sample Diameter (in):	3.004	Sample Diameter (in):	3.004	Saturation (%):	98
Area (in <sup>2</sup> ):	7.087	Area (in <sup>2</sup> ):	7.087	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	30.97	Volume (in <sup>3</sup> ):	30.97	Optimum Moisture Content (%):	N/A
Moisture Content (%):	45.7	Moisture Content (%):	47.3		
Dry Unit Weight (pcf):	73.1	Dry Unit Weight (pcf):	73.1		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	1.2 x 10 <sup>-6</sup>

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 33 days when it was set up in the permeability cell on 4/5/2011.

Reviewed by:

Date:

4/8/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-79A-3-11 ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE: 4/8/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 3/16/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S79A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 14-16, Cast 3/5/2011  
Sample Type: 3x6 cylinder

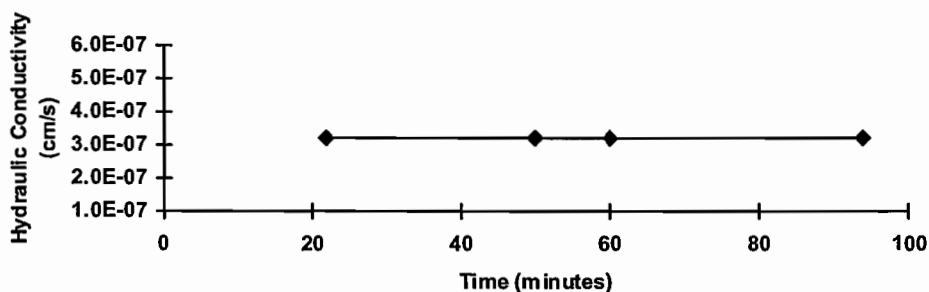
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	2.026	Weight (lbs):	2.051	Permeant Liquid:	Water
Sample Length (in):	4.409	Sample Length (in):	4.409	Test Method:	C
Sample Diameter (in):	3.004	Sample Diameter (in):	3.004	Saturation (%):	98
Area (in <sup>2</sup> ):	7.087	Area (in <sup>2</sup> ):	7.087	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	31.25	Volume (in <sup>3</sup> ):	31.25	Optimum Moisture Content (%):	N/A
Moisture Content (%):	37.2	Moisture Content (%):	38.9		
Dry Unit Weight (pcf):	81.7	Dry Unit Weight (pcf):	81.7		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$3.2 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 30 days when it was set up in the permeability cell on 4/5/2011.

Reviewed by:

Date:

4/8/11



# ATLANTIC TESTING LABORATORIES

**Albany**  
22 Corporate Drive  
Clifton Park, NY 12065  
518-383-9144 (T)  
518-383-9166 (F)

## TRANSMITTAL

May 30, 2011

AECOM  
40 British American Boulevard  
Latham, New York 12110

Attn: Mr. Scott Serviss

E/Mail: [scott.serviss@aecom.com](mailto:scott.serviss@aecom.com)

Re: Soil Laboratory Testing  
NGP Site  
Norwich, New York  
ATL Project No.: AT1573

Dear Mr. Serviss:

Enclosed are the following reports:

AT1573SL-106A-4-11	Hydraulic Conductivity	April 13, 2011
AT1573SL-108A-4-11	Hydraulic Conductivity	April 13, 2011
AT1573SL-109A-4-11	Hydraulic Conductivity	April 13, 2011
AT1573SL-119A-4-11	Hydraulic Conductivity	April 13, 2011

Please contact our office should you have any questions or if we may be of further service.

Sincerely,  
ATLANTIC TESTING LABORATORIES, Limited

Robert E. Field  
Laboratory Manager  
[bfield@atlantictesting.com](mailto:bfield@atlantictesting.com)

REF/rf

Enclosures



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-106A-4-11 ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE: 6/7/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 4/13/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S106A (revised)  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 10-28, Cast 3/31/2011  
Sample Type: 3x6 cylinder

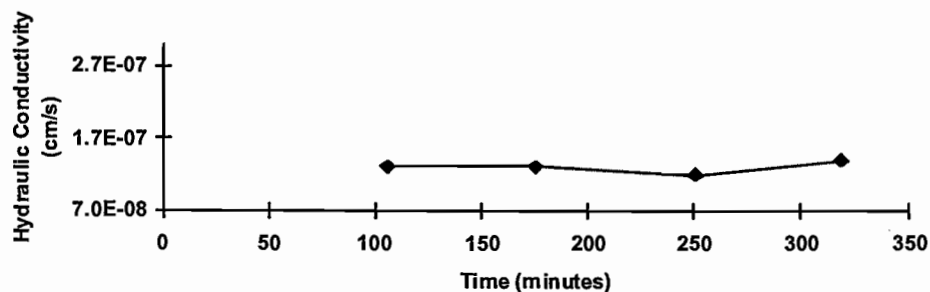
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	1.765	Weight (lbs):	1.791	Permeant Liquid:	Water
Sample Length (in):	3.913	Sample Length (in):	3.913	Test Method:	C
Sample Diameter (in):	3.015	Sample Diameter (in):	3.015	Saturation (%):	98
Area (in <sup>2</sup> ):	7.139	Area (in <sup>2</sup> ):	7.139	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	27.93	Volume (in <sup>3</sup> ):	27.93	Optimum Moisture Content (%):	N/A
Moisture Content (%):	41.8	Moisture Content (%):	41.3		
Dry Unit Weight (pcf):	77.0	Dry Unit Weight (pcf):	77.0		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$1.4 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 48 days when it was set up in the permeability cell on 5/18/2011.

This cylinder was marked on the side as 10-26 but the paper work had it identified as 10-28. This report has been revised to show the sample ID as 10-28.

Reviewed by:

Date: 6/7/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-108A-4-11 ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE : 5/30/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 4/13/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S108A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 12-25, Cast 4/1/2011  
Sample Type: 3x6 cylinder

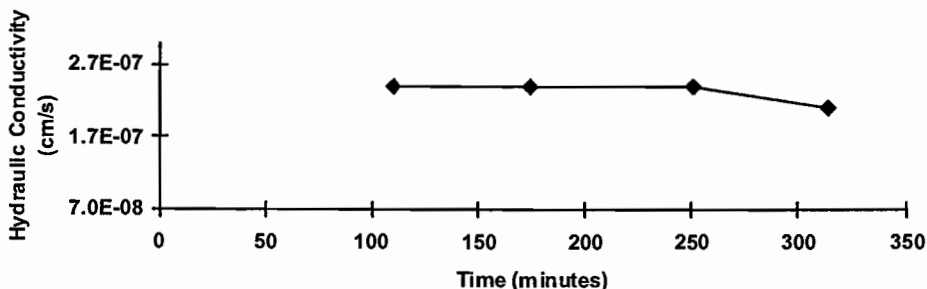
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	1.692	Weight (lbs):	1.714	Permeant Liquid:	Water
Sample Length (in):	3.979	Sample Length (in):	3.979	Test Method:	C
Sample Diameter (in):	3.021	Sample Diameter (in):	3.021	Saturation (%):	98
Area (in <sup>2</sup> ):	7.168	Area (in <sup>2</sup> ):	7.168	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	28.52	Volume (in <sup>3</sup> ):	28.52	Optimum Moisture Content (%):	N/A
Moisture Content (%):	51.8	Moisture Content (%):	51.4		
Dry Unit Weight (pcf):	67.5	Dry Unit Weight (pcf):	67.5		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$2.3 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 47 days when it was set up in the permeability cell on 5/18/2011.

Reviewed by:

Date:

5/30/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-109A-4-11

ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE : 5/30/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 4/13/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S109A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 10-24, Cast 4/2/2011  
Sample Type: 3x6 cylinder

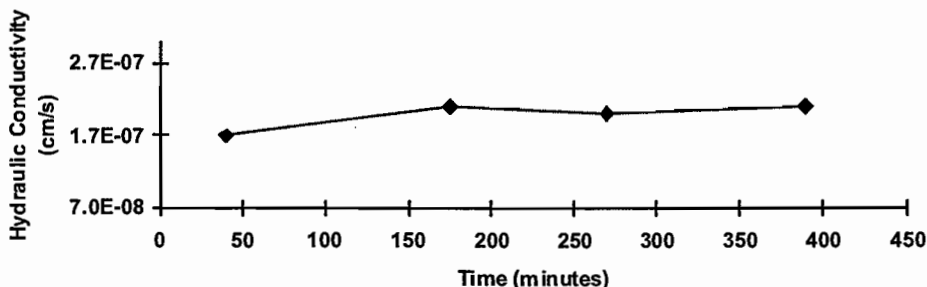
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	1.878	Weight (lbs):	1.896	Permeant Liquid:	Water
Sample Length (in):	4.215	Sample Length (in):	4.215	Test Method:	C
Sample Diameter (in):	3.018	Sample Diameter (in):	3.018	Saturation (%):	98
Area (in <sup>2</sup> ):	7.154	Area (in <sup>2</sup> ):	7.154	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	30.15	Volume (in <sup>3</sup> ):	30.15	Optimum Moisture Content (%):	N/A
Moisture Content (%):	39.1	Moisture Content (%):	41.3		
Dry Unit Weight (pcf):	77.4	Dry Unit Weight (pcf):	77.4		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	2.0 x 10 <sup>-7</sup>

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 46 days when it was set up in the permeability cell on 5/18/2011.

Reviewed by:

Date:

5/30/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-119A-4-11

ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE : 5/30/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 4/13/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S119A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 6-17, Cast 4/6/2011  
Sample Type: 3x6 cylinder

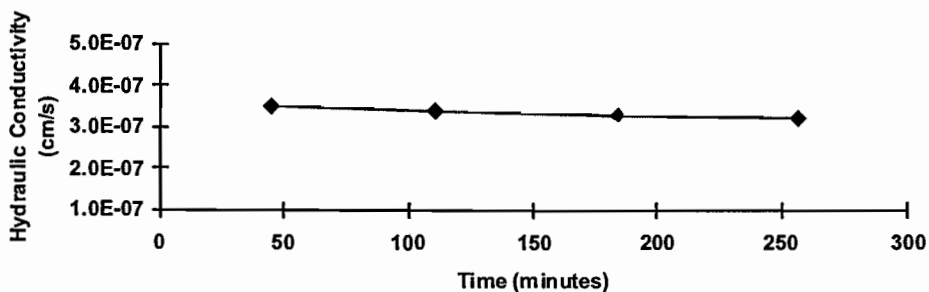
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	1.947	Weight (lbs):	1.978	Permeant Liquid:	Water
Sample Length (in):	4.252	Sample Length (in):	4.252	Test Method:	C
Sample Diameter (in):	3.004	Sample Diameter (in):	3.004	Saturation (%):	98
Area (in <sup>2</sup> ):	7.087	Area (in <sup>2</sup> ):	7.087	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	30.13	Volume (in <sup>3</sup> ):	30.13	Optimum Moisture Content (%):	N/A
Moisture Content (%):	44.7	Moisture Content (%):	45.9		
Dry Unit Weight (pcf):	77.2	Dry Unit Weight (pcf):	77.7		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$3.3 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 43 days when it was set up in the permeability cell on 5/20/2011.

Reviewed by:

Date:

5/30/11



# ATLANTIC TESTING LABORATORIES

**Albany**  
22 Corporate Drive  
Clifton Park, NY 12065  
518-383-9144 (T)  
518-383-9166 (F)

## TRANSMITTAL

April 14, 2011

AECOM  
40 British American Boulevard  
Latham, New York 12110

Attn: Mr. Scott Serviss

E/Mail: [scott.serviss@aecom.com](mailto:scott.serviss@aecom.com)

Re: Soil Laboratory Testing  
NGP Site  
Norwich, New York  
ATL Project No.: AT1573

Dear Mr. Serviss:

Enclosed are the following reports:

AT1573SL-53B-2-11	Hydraulic Conductivity	March 24, 2011
AT1573SL-80A-3-11	Hydraulic Conductivity	March 16, 2011
AT1573SL-81A-3-11	Hydraulic Conductivity	March 24, 2011
AT1573SL-82A-3-11	Hydraulic Conductivity	March 24, 2011
AT1573SL-83A-3-11	Hydraulic Conductivity	March 24, 2011
AT1573SL-84A-3-11	Hydraulic Conductivity	March 24, 2011

Please contact our office should you have any questions or if we may be of further service.

Sincerely,  
ATLANTIC TESTING LABORATORIES, Limited

Robert E. Field  
Laboratory Manager  
[bfield@atlantictesting.com](mailto:bfield@atlantictesting.com)

REF/nd

Enclosures





# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-53B-2-11 ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE : 4/14/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 3/24/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S53B  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 20-4, Cast 2/8/2011  
Sample Type: 3x6 cylinder

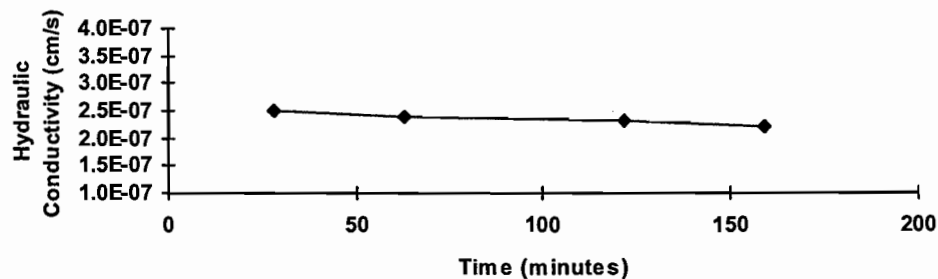
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	1.883	Weight (lbs):	1.903	Permeant Liquid:	Water
Sample Length (in):	4.370	Sample Length (in):	4.370	Test Method:	C
Sample Diameter (in):	3.004	Sample Diameter (in):	3.004	Saturation (%):	98
Area (in <sup>2</sup> ):	7.087	Area (in <sup>2</sup> ):	7.087	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	30.97	Volume (in <sup>3</sup> ):	30.97	Optimum Moisture Content (%):	N/A
Moisture Content (%):	47.4	Moisture Content (%):	49.0		
Dry Unit Weight (pcf):	71.3	Dry Unit Weight (pcf):	71.3		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$2.4 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 59 days when it was set up in the permeability cell on 4/8/2011.

Reviewed by:

Date:

4/14/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-80A-3-11 ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE : 4/13/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 3/16/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S80A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 13-15, Cast 3/5/2011  
Sample Type: 3x6 cylinder

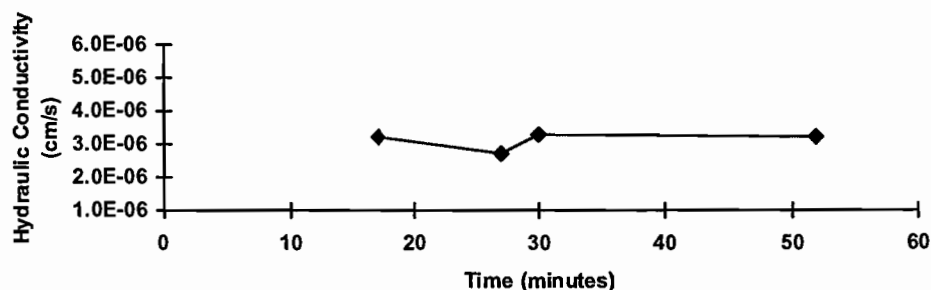
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	2.126	Weight (lbs):	2.154	Permeant Liquid:	Water
Sample Length (in):	4.606	Sample Length (in):	4.606	Test Method:	C
Sample Diameter (in):	3.004	Sample Diameter (in):	3.004	Saturation (%):	98
Area (in <sup>2</sup> ):	7.087	Area (in <sup>2</sup> ):	7.087	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	32.64	Volume (in <sup>3</sup> ):	32.64	Optimum Moisture Content (%):	N/A
Moisture Content (%):	36.5	Moisture Content (%):	38.3		
Dry Unit Weight (pcf):	82.5	Dry Unit Weight (pcf):	82.4		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$3.1 \times 10^{-6}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 34 days when it was set up in the permeability cell on 4/8/2011.

Reviewed by: \_\_\_\_\_

Date: \_\_\_\_\_

4/14/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-81A-3-11 ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE : 4/14/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 3/24/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S81A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 11-15, Cast 3/8/2011  
Sample Type: 3x6 cylinder

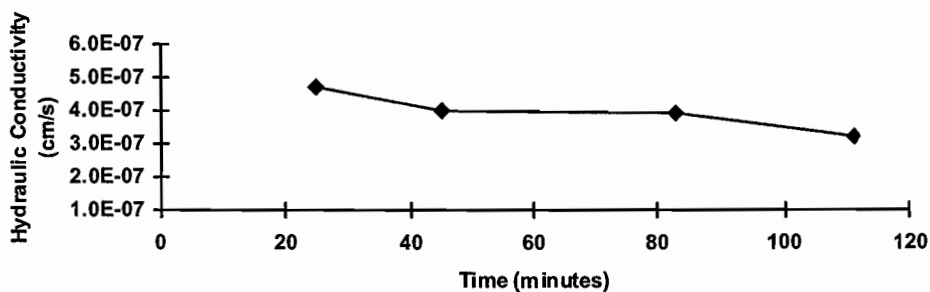
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	1.969	Weight (lbs):	1.994	Permeant Liquid:	Water
Sample Length (in):	4.370	Sample Length (in):	4.370	Test Method:	C
Sample Diameter (in):	3.004	Sample Diameter (in):	3.004	Saturation (%):	98
Area (in <sup>2</sup> ):	7.087	Area (in <sup>2</sup> ):	7.087	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	30.97	Volume (in <sup>3</sup> ):	30.97	Optimum Moisture Content (%):	N/A
Moisture Content (%):	40.3	Moisture Content (%):	42.1		
Dry Unit Weight (pcf):	78.3	Dry Unit Weight (pcf):	78.3		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$4.0 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 28 days when it was set up in the permeability cell on 4/8/2011.

Reviewed by:

Date:

4/14/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-82A-3-11 ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE : 4/14/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 3/24/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S82A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 10-12, Cast 3/9/2011  
Sample Type: 3x6 cylinder

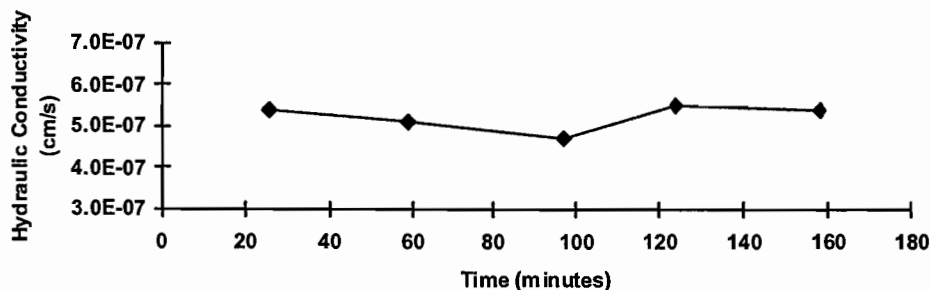
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	1.939	Weight (lbs):	1.966	Permeant Liquid:	Water
Sample Length (in):	4.291	Sample Length (in):	4.291	Test Method:	C
Sample Diameter (in):	3.004	Sample Diameter (in):	3.004	Saturation (%):	98
Area (in <sup>2</sup> ):	7.087	Area (in <sup>2</sup> ):	7.087	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	30.41	Volume (in <sup>3</sup> ):	30.41	Optimum Moisture Content (%):	N/A
Moisture Content (%):	37.8	Moisture Content (%):	39.7		
Dry Unit Weight (pcf):	80.0	Dry Unit Weight (pcf):	80.0		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$5.2 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 30 days when it was set up in the permeability cell on 4/8/2011.

Reviewed by:

Date:

4/14/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-83A-3-11

ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE : 4/14/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 3/24/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S83A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 10-13, Cast 3/10/2011  
Sample Type: 3x6 cylinder

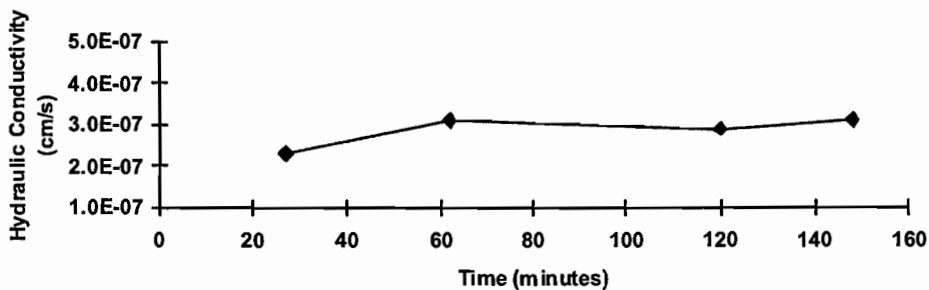
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	2.111	Weight (lbs):	2.136	Permeant Liquid:	Water
Sample Length (in):	4.528	Sample Length (in):	4.528	Test Method:	C
Sample Diameter (in):	3.004	Sample Diameter (in):	3.004	Saturation (%):	98
Area (in <sup>2</sup> ):	7.087	Area (in <sup>2</sup> ):	7.087	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	32.09	Volume (in <sup>3</sup> ):	32.09	Optimum Moisture Content (%):	N/A
Moisture Content (%):	34.1	Moisture Content (%):	35.7		
Dry Unit Weight (pcf):	84.8	Dry Unit Weight (pcf):	84.8		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$2.9 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 29 days when it was set up in the permeability cell on 4/8/2011.

Reviewed by:

Date:

4/14/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-84A-3-11 ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE : 4/14/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 3/24/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S84A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 10-15, Cast 3/11/2011  
Sample Type: 3x6 cylinder

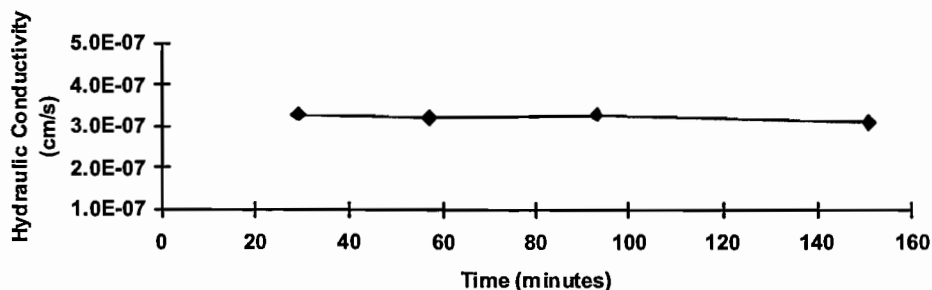
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	1.976	Weight (lbs):	1.994	Permeant Liquid:	Water
Sample Length (in):	4.252	Sample Length (in):	4.252	Test Method:	C
Sample Diameter (in):	3.004	Sample Diameter (in):	3.004	Saturation (%):	96
Area (in <sup>2</sup> ):	7.087	Area (in <sup>2</sup> ):	7.087	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	30.13	Volume (in <sup>3</sup> ):	30.13	Optimum Moisture Content (%):	N/A
Moisture Content (%):	34.3	Moisture Content (%):	35.5		
Dry Unit Weight (pcf):	84.4	Dry Unit Weight (pcf):	84.4		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$3.2 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 28 days when it was set up in the permeability cell on 4/8/2011.

Reviewed by:

Date:

4/14/11



# ATLANTIC TESTING LABORATORIES

**Albany**  
22 Corporate Drive  
Clifton Park, NY 12065  
518-383-9144 (T)  
518-383-9166 (F)

## TRANSMITTAL

April 19, 2011

AECOM  
40 British American Boulevard  
Latham, New York 12110

Attn: Mr. Scott Serviss

E/Mail: [scott.serviss@aecom.com](mailto:scott.serviss@aecom.com)

Re: Soil Laboratory Testing  
NGP Site  
Norwich, New York  
ATL Project No.: AT1573

Dear Mr. Serviss:

Enclosed are the following reports:

AT1573SL-85A-3-11	Hydraulic Conductivity	March 24, 2011
AT1573SL-89A-3-11	Hydraulic Conductivity	March 30, 2011
AT1573SL-90A-3-11	Hydraulic Conductivity	March 30, 2011

Please contact our office should you have any questions or if we may be of further service.

Sincerely,  
*ATLANTIC TESTING LABORATORIES, Limited*

Robert E. Field  
Laboratory Manager  
[bfield@atlantictesting.com](mailto:bfield@atlantictesting.com)

REF/nd

Enclosures



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-85A-3-11 ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE : 4/19/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 3/24/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S85A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 30-21, Cast 3/13/2011  
Sample Type: 3x6 cylinder

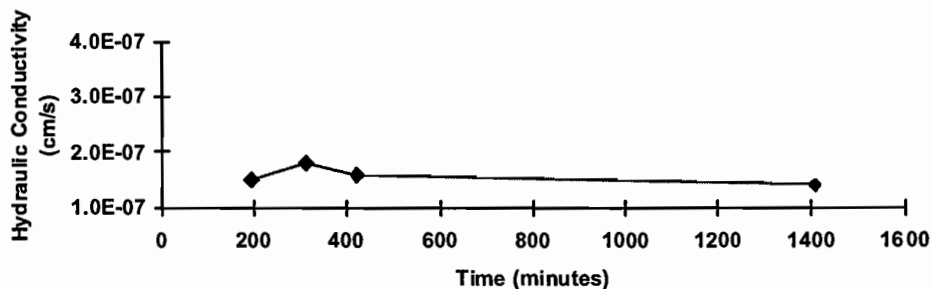
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	1.918	Weight (lbs):	1.950	Permeant Liquid:	Water
Sample Length (in):	4.228	Sample Length (in):	4.228	Test Method:	C
Sample Diameter (in):	3.015	Sample Diameter (in):	3.015	Saturation (%):	98
Area (in <sup>2</sup> ):	7.139	Area (in <sup>2</sup> ):	7.139	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	30.19	Volume (in <sup>3</sup> ):	30.19	Optimum Moisture Content (%):	N/A
Moisture Content (%):	38.9	Moisture Content (%):	41.1		
Dry Unit Weight (pcf):	79.0	Dry Unit Weight (pcf):	79.0		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	1.6 x 10 <sup>-7</sup>

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 30 days when it was set up in the permeability cell on 4/12/2011.

Reviewed by:

Date:

4/19/11





# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-89A-3-11

ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE : 4/19/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 3/30/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S89A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 26-20, Cast 3/16/2011  
Sample Type: 3x6 cylinder

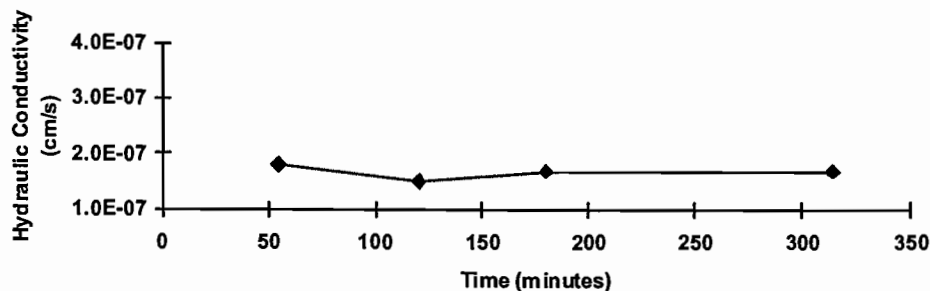
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	1.727	Weight (lbs):	1.749	Permeant Liquid:	Water
Sample Length (in):	3.790	Sample Length (in):	3.790	Test Method:	C
Sample Diameter (in):	3.010	Sample Diameter (in):	3.010	Saturation (%):	98
Area (in <sup>2</sup> ):	7.116	Area (in <sup>2</sup> ):	7.116	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	26.97	Volume (in <sup>3</sup> ):	26.97	Optimum Moisture Content (%):	N/A
Moisture Content (%):	37.1	Moisture Content (%):	40.8		
Dry Unit Weight (pcf):	80.7	Dry Unit Weight (pcf):	80.7		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$1.7 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 27 days when it was set up in the permeability cell on 4/12/2011.

Reviewed by:

Date: 4/19/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-90A-3-11

ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE : 4/19/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 3/30/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S90A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 24-20, Cast 3/17/2011  
Sample Type: 3x6 cylinder

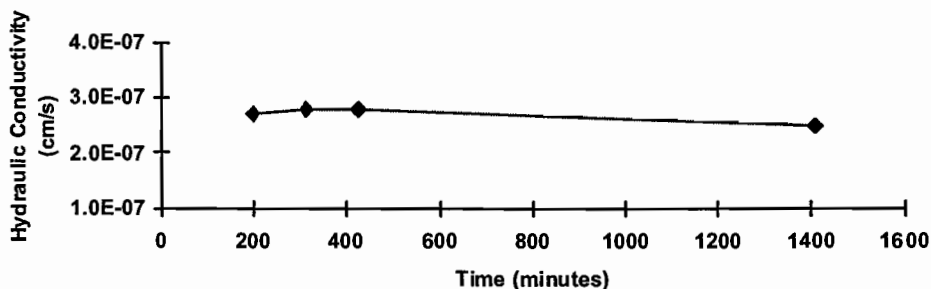
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	1.816	Weight (lbs):	1.845	Permeant Liquid:	Water
Sample Length (in):	4.027	Sample Length (in):	4.027	Test Method:	C
Sample Diameter (in):	3.013	Sample Diameter (in):	3.013	Saturation (%):	98
Area (in <sup>2</sup> ):	7.130	Area (in <sup>2</sup> ):	7.130	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	28.71	Volume (in <sup>3</sup> ):	28.71	Optimum Moisture Content (%):	N/A
Moisture Content (%):	41.0	Moisture Content (%):	42.6		
Dry Unit Weight (pcf):	77.5	Dry Unit Weight (pcf):	77.5		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$2.7 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 26 days when it was set up in the permeability cell on 4/12/2011.

Reviewed by:

Date:

4/19/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-86A-3-11 ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE : 4/21/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 3/24/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S86A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 31-15, Cast 3/13/2011  
Sample Type: 3x6 cylinder

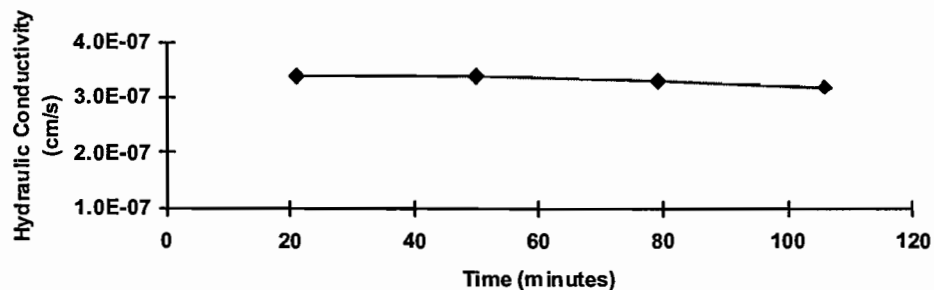
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	2.073	Weight (lbs):	2.099	Permeant Liquid:	Water
Sample Length (in):	4.488	Sample Length (in):	4.488	Test Method:	C
Sample Diameter (in):	3.004	Sample Diameter (in):	3.004	Saturation (%):	96
Area (in <sup>2</sup> ):	7.087	Area (in <sup>2</sup> ):	7.087	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	31.81	Volume (in <sup>3</sup> ):	31.81	Optimum Moisture Content (%):	N/A
Moisture Content (%):	38.2	Moisture Content (%):	39.9		
Dry Unit Weight (pcf):	81.5	Dry Unit Weight (pcf):	81.5		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$3.3 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 36 days when it was set up in the permeability cell on 4/18/2011.

Reviewed by:

Date:

4/21/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-87A-3-11

ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE : 4/21/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 3/24/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S87A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 29-20, Cast 3/14/2011  
Sample Type: 3x6 cylinder

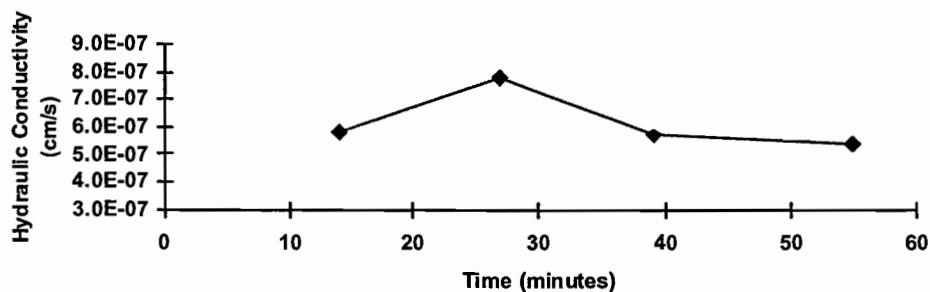
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	2.059	Weight (lbs):	2.085	Permeant Liquid:	Water
Sample Length (in):	4.528	Sample Length (in):	4.528	Test Method:	C
Sample Diameter (in):	3.004	Sample Diameter (in):	3.004	Saturation (%):	98
Area (in <sup>2</sup> ):	7.087	Area (in <sup>2</sup> ):	7.087	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	32.09	Volume (in <sup>3</sup> ):	32.09	Optimum Moisture Content (%):	N/A
Moisture Content (%):	39.5	Moisture Content (%):	41.3		
Dry Unit Weight (pcf):	79.5	Dry Unit Weight (pcf):	79.5		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$6.2 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 35 days when it was set up in the permeability cell on 4/18/2011.

Reviewed by:

Date:

4/21/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-88A-3-11 ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE : 4/21/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 3/30/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S88A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 28-21, Cast 3/15/2011  
Sample Type: 3x6 cylinder

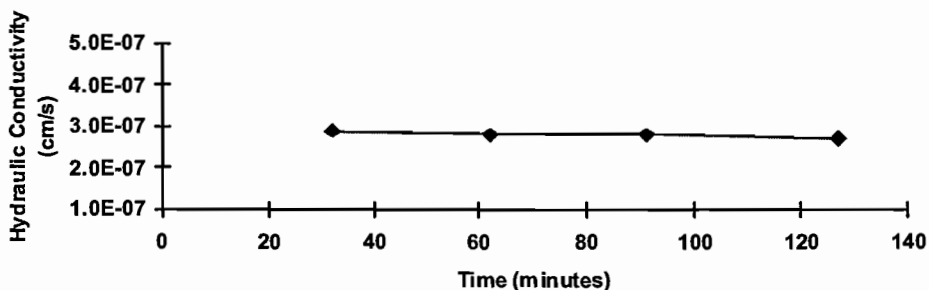
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	2.038	Weight (lbs):	2.061	Permeant Liquid:	Water
Sample Length (in):	4.488	Sample Length (in):	4.488	Test Method:	C
Sample Diameter (in):	3.004	Sample Diameter (in):	3.004	Saturation (%):	98
Area (in <sup>2</sup> ):	7.087	Area (in <sup>2</sup> ):	7.087	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	31.81	Volume (in <sup>3</sup> ):	31.81	Optimum Moisture Content (%):	N/A
Moisture Content (%):	40.3	Moisture Content (%):	41.9		
Dry Unit Weight (pcf):	78.9	Dry Unit Weight (pcf):	78.9		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$2.8 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 34 days when it was set up in the permeability cell on 4/18/2011.

Reviewed by:

Date:

4/21/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-91A-3-11 ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE : 4/21/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 3/30/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S91A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 23-20, Cast 3/17/2011  
Sample Type: 3x6 cylinder

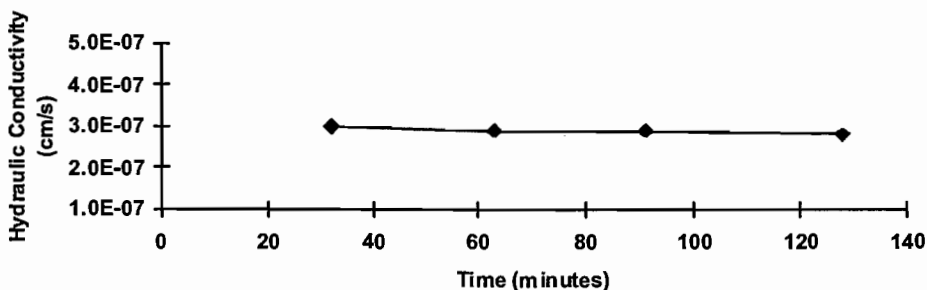
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	1.988	Weight (lbs):	2.013	Permeant Liquid:	Water
Sample Length (in):	4.488	Sample Length (in):	4.488	Test Method:	C
Sample Diameter (in):	3.004	Sample Diameter (in):	3.004	Saturation (%):	98
Area (in <sup>2</sup> ):	7.087	Area (in <sup>2</sup> ):	7.087	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	31.81	Volume (in <sup>3</sup> ):	31.81	Optimum Moisture Content (%):	N/A
Moisture Content (%):	42.7	Moisture Content (%):	44.5		
Dry Unit Weight (pcf):	75.7	Dry Unit Weight (pcf):	75.7		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$2.9 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 32 days when it was set up in the permeability cell on 4/18/2011.

Reviewed by:

Date:

4/21/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-92A-3-11 ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE : 4/21/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 3/30/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S92A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 23-23, Cast 3/18/2011  
Sample Type: 3x6 cylinder

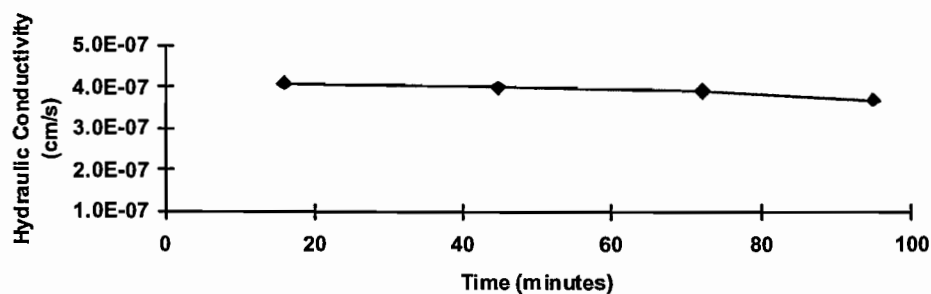
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	1.961	Weight (lbs):	1.981	Permeant Liquid:	Water
Sample Length (in):	4.331	Sample Length (in):	4.331	Test Method:	C
Sample Diameter (in):	3.004	Sample Diameter (in):	3.004	Saturation (%):	96
Area (in <sup>2</sup> ):	7.087	Area (in <sup>2</sup> ):	7.087	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	30.69	Volume (in <sup>3</sup> ):	30.69	Optimum Moisture Content (%):	N/A
Moisture Content (%):	40.5	Moisture Content (%):	41.9		
Dry Unit Weight (pcf):	78.6	Dry Unit Weight (pcf):	78.6		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$3.9 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 31 days when it was set up in the permeability cell on 4/18/2011.

Reviewed by:

Date:

4/21/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-93A-3-11

ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE : 4/21/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 3/30/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S93A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 19-25, Cast 3/19/2011  
Sample Type: 3x6 cylinder

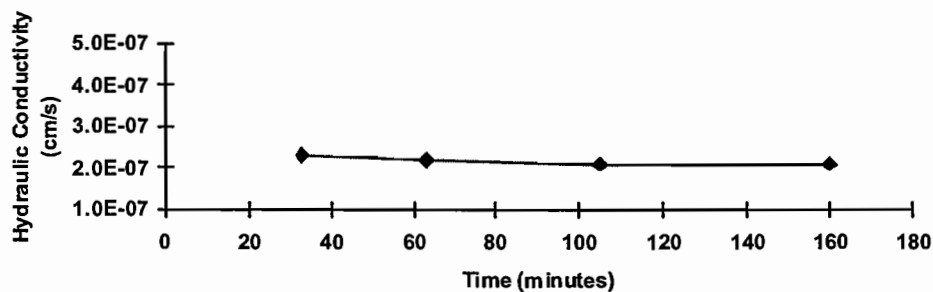
### SAMPLE INFORMATION

INITIAL	FINAL	PARAMETERS
Weight (lbs): 1.989	Weight (lbs): 2.015	Permeant Liquid: Water
Sample Length (in): 4.409	Sample Length (in): 4.409	Test Method: C
Sample Diameter (in): 3.004	Sample Diameter (in): 3.004	Saturation (%): 96
Area (in <sup>2</sup> ): 7.087	Area (in <sup>2</sup> ): 7.087	Maximum Dry Density (pcf): N/A
Volume (in <sup>3</sup> ): 31.25	Volume (in <sup>3</sup> ): 31.25	Optimum Moisture Content (%): N/A
Moisture Content (%): 39.8	Moisture Content (%): 41.6	
Dry Unit Weight (pcf): 78.7	Dry Unit Weight (pcf): 78.7	

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$2.2 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 30 days when it was set up in the permeability cell on 4/18/2011.

Reviewed by:

Date:

4/21/11





# ATLANTIC TESTING LABORATORIES

**Albany**  
22 Corporate Drive  
Clifton Park, NY 12065  
518-383-9144 (T)  
518-383-9166 (F)

## TRANSMITTAL

April 25, 2011

AECOM  
40 British American Boulevard  
Latham, New York 12110

Attn: Mr. Scott Serviss

E/Mail: [scott.serviss@aecom.com](mailto:scott.serviss@aecom.com)

Re: Soil Laboratory Testing  
NGP Site  
Norwich, New York  
ATL Project No.: AT1573

Dear Mr. Serviss:

Enclosed are the following reports:

AT1573SL-94A-4-11	Hydraulic Conductivity	April 6, 2011
AT1573SL-95A-4-11	Hydraulic Conductivity	April 6, 2011
AT1573SL-96A-4-11	Hydraulic Conductivity	April 6, 2011

Please contact our office should you have any questions or if we may be of further service.

Sincerely,  
ATLANTIC TESTING LABORATORIES, Limited

Robert E. Field  
Laboratory Manager  
[bfield@atlantictesting.com](mailto:bfield@atlantictesting.com)

REF/rf

Enclosures



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-94A-3-11 ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE : 4/25/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 4/6/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S94A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 30-15, Cast 3/21/2011  
Sample Type: 3x6 cylinder

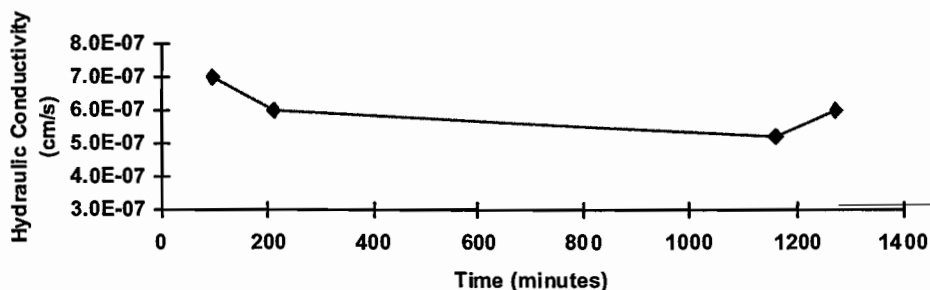
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	1.828	Weight (lbs):	1.868	Permeant Liquid:	Water
Sample Length (in):	4.270	Sample Length (in):	4.270	Test Method:	C
Sample Diameter (in):	3.020	Sample Diameter (in):	3.020	Saturation (%):	96
Area (in <sup>2</sup> ):	7.160	Area (in <sup>2</sup> ):	7.160	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	30.57	Volume (in <sup>3</sup> ):	30.57	Optimum Moisture Content (%):	N/A
Moisture Content (%):	46.9	Moisture Content (%):	50.2		
Dry Unit Weight (pcf):	70.2	Dry Unit Weight (pcf):	70.2		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$6.1 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 25 days when it was set up in the permeability cell on 4/15/2011.

Reviewed by:

Date:

4/25/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-95A-3-11 ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE: 4/25/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 4/6/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S95A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 27-17, Cast 3/22/2011  
Sample Type: 3x6 cylinder

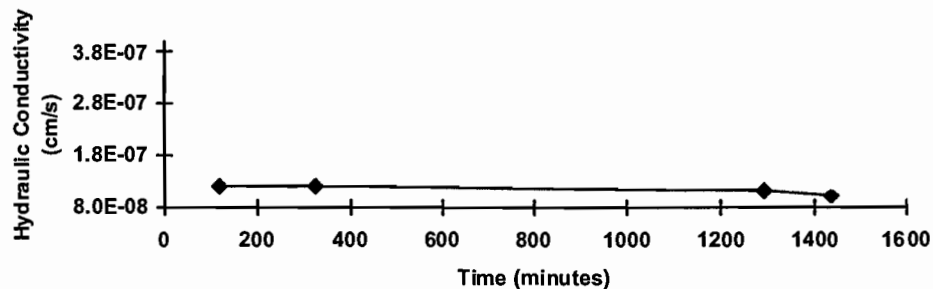
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	1.668	Weight (lbs):	1.704	Permeant Liquid:	Water
Sample Length (in):	3.90	Sample Length (in):	3.90	Test Method:	C
Sample Diameter (in):	3.01	Sample Diameter (in):	3.01	Saturation (%):	96
Area (in <sup>2</sup> ):	7.112	Area (in <sup>2</sup> ):	7.112	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	27.74	Volume (in <sup>3</sup> ):	27.74	Optimum Moisture Content (%):	N/A
Moisture Content (%):	45.5	Moisture Content (%):	48.7		
Dry Unit Weight (pcf):	71.3	Dry Unit Weight (pcf):	70.3		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$1.1 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 24 days when it was set up in the permeability cell on 4/15/2011.

Reviewed by:

Date:

4/25/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-96A-3-11 ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE: 4/25/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 4/6/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S96A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 22-18, Cast 3/22/2011  
Sample Type: 3x6 cylinder

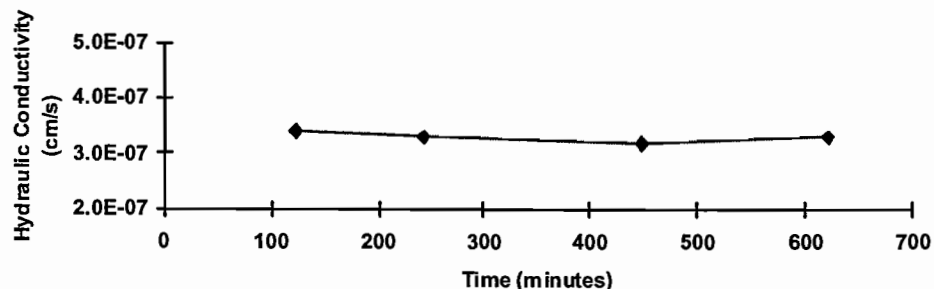
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	1.682	Weight (lbs):	1.716	Permeant Liquid:	Water
Sample Length (in):	3.93	Sample Length (in):	3.93	Test Method:	C
Sample Diameter (in):	3.02	Sample Diameter (in):	3.02	Saturation (%):	96
Area (in <sup>2</sup> ):	7.160	Area (in <sup>2</sup> ):	7.160	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	28.14	Volume (in <sup>3</sup> ):	28.14	Optimum Moisture Content (%):	N/A
Moisture Content (%):	48.8	Moisture Content (%):	51.9		
Dry Unit Weight (pcf):	69.4	Dry Unit Weight (pcf):	69.3		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$3.3 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 24 days when it was set up in the permeability cell on 4/15/2011.

Reviewed by:

Date:

4/25/11



# ATLANTIC TESTING LABORATORIES

**Albany**  
22 Corporate Drive  
Clifton Park, NY 12065  
518-383-9144 (T)  
518-383-9166 (F)

## TRANSMITTAL

April 26, 2011

AECOM  
40 British American Boulevard  
Latham, New York 12110

Attn: Mr. Scott Serviss

E/Mail: [scott.serviss@aecom.com](mailto:scott.serviss@aecom.com)

Re: Soil Laboratory Testing  
NGP Site  
Norwich, New York  
ATL Project No.: AT1573

Dear Mr. Serviss:

Enclosed are the following reports:

AT1573SL-97A-4-11	Hydraulic Conductivity	April 6, 2011
AT1573SL-98A-4-11	Hydraulic Conductivity	April 6, 2011
AT1573SL-99A-4-11	Hydraulic Conductivity	April 6, 2011
AT1573SL-100A-4-11	Hydraulic Conductivity	April 6, 2011
AT1573SL-101A-4-11	Hydraulic Conductivity	April 13, 2011
AT1573SL-102A-4-11	Hydraulic Conductivity	April 13, 2011
AT1573SL-103A-4-11	Hydraulic Conductivity	April 13, 2011
AT1573SL-104A-4-11	Hydraulic Conductivity	April 6, 2011
AT1573SL-105A-4-11	Hydraulic Conductivity	April 13, 2011

Please contact our office should you have any questions or if we may be of further service.

Sincerely,  
*ATLANTIC TESTING LABORATORIES, Limited*

Robert E. Field  
Laboratory Manager  
[bfield@atlantictesting.com](mailto:bfield@atlantictesting.com)

REF/rf

Enclosures



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-97A-3-11

ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE : 4/26/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 4/6/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S97A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 17-16, Cast 3/23/2011  
Sample Type: 3x6 cylinder

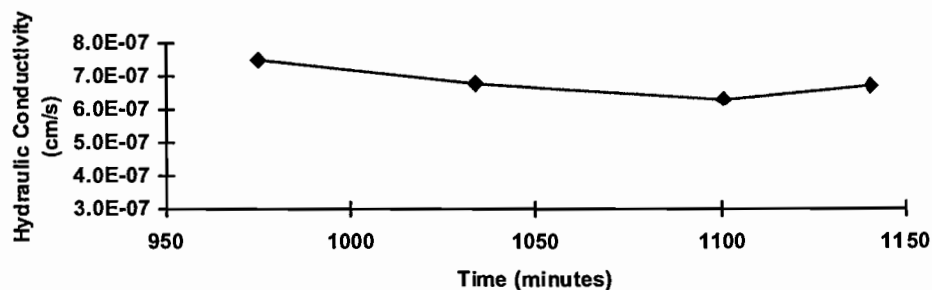
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	1.710	Weight (lbs):	1.744	Permeant Liquid:	Water
Sample Length (in):	3.95	Sample Length (in):	3.95	Test Method:	C
Sample Diameter (in):	3.020	Sample Diameter (in):	3.020	Saturation (%):	96
Area (in <sup>2</sup> ):	7.160	Area (in <sup>2</sup> ):	7.160	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	28.28	Volume (in <sup>3</sup> ):	28.28	Optimum Moisture Content (%):	N/A
Moisture Content (%):	45.7	Moisture Content (%):	48.6		
Dry Unit Weight (pcf):	71.7	Dry Unit Weight (pcf):	72.0		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$6.8 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 26 days when it was set up in the permeability cell on 4/18/2011.

Reviewed by:

Date:

4/26/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-98A-3-11 ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE : 4/26/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 4/6/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S98A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 15-16, Cast 3/24/2011  
Sample Type: 3x6 cylinder

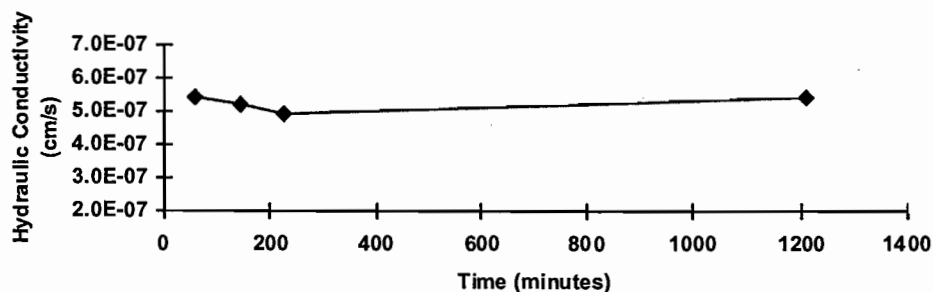
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	1.802	Weight (lbs):	1.840	Permeant Liquid:	Water
Sample Length (in):	4.120	Sample Length (in):	4.120	Test Method:	C
Sample Diameter (in):	3.020	Sample Diameter (in):	3.020	Saturation (%):	96
Area (in <sup>2</sup> ):	7.160	Area (in <sup>2</sup> ):	7.160	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	29.50	Volume (in <sup>3</sup> ):	29.50	Optimum Moisture Content (%):	N/A
Moisture Content (%):	43.2	Moisture Content (%):	46.3		
Dry Unit Weight (pcf):	73.7	Dry Unit Weight (pcf):	73.1		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$5.2 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 25 days when it was set up in the permeability cell on 4/18/2011.

Reviewed by: 

Date: 4/26/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-99A-3-11 ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE : 4/26/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 4/6/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S99A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 16-21, Cast 3/24/2011  
Sample Type: 3x6 cylinder

### SAMPLE INFORMATION

#### INITIAL

Weight (lbs): 1.774  
Sample Length (in): 4.030  
Sample Diameter (in): 3.020  
Area (in<sup>2</sup>): 7.160  
Volume (in<sup>3</sup>): 28.85  
Moisture Content (%): 39.8  
Dry Unit Weight (pcf): 76.0

#### FINAL

Weight (lbs): 1.816  
Sample Length (in): 4.030  
Sample Diameter (in): 3.020  
Area (in<sup>2</sup>): 7.160  
Volume (in<sup>3</sup>): 28.85  
Moisture Content (%): 43.1  
Dry Unit Weight (pcf): 76.0

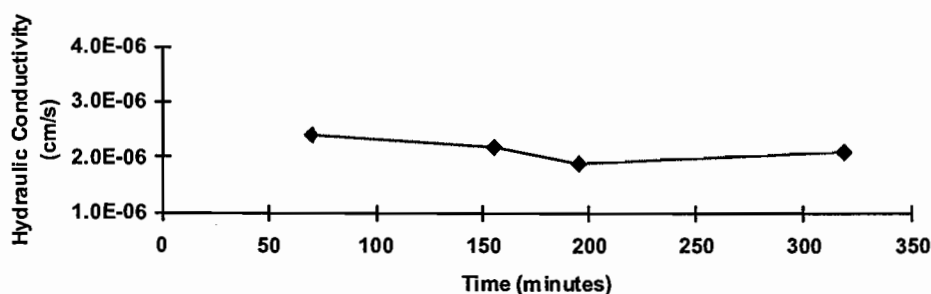
#### PARAMETERS

Permeant Liquid: Water  
Test Method: C  
Saturation (%): 96  
Maximum Dry Density (pcf): N/A  
Optimum Moisture Content (%): N/A

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$2.2 \times 10^{-6}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 25 days when it was set up in the permeability cell on 4/18/2011.

Reviewed by:

Date:

4/26/11





# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-100A-3-11

ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE : 4/26/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 4/6/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S100A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 13-24, Cast 3/25/2011  
Sample Type: 3x6 cylinder

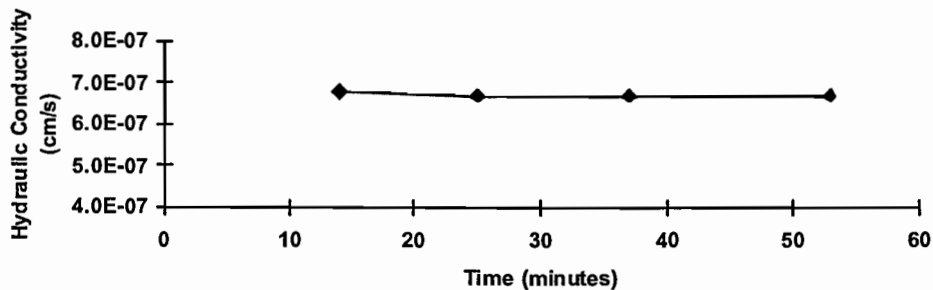
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	1.992	Weight (lbs):	2.027	Permeant Liquid:	Water
Sample Length (in):	4.488	Sample Length (in):	4.488	Test Method:	C
Sample Diameter (in):	3.004	Sample Diameter (in):	3.004	Saturation (%):	96
Area (in <sup>2</sup> ):	7.087	Area (in <sup>2</sup> ):	7.087	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	31.80	Volume (in <sup>3</sup> ):	31.80	Optimum Moisture Content (%):	N/A
Moisture Content (%):	40.9	Moisture Content (%):	43.3		
Dry Unit Weight (pcf):	76.8	Dry Unit Weight (pcf):	76.8		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$6.7 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 26 days when it was set up in the permeability cell on 4/20/2011.

Reviewed by:

Date:

4/26/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-101A-3-11

ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE : 4/26/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 4/13/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S101A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 2-6, Cast 3/28/2011  
Sample Type: 3x6 cylinder

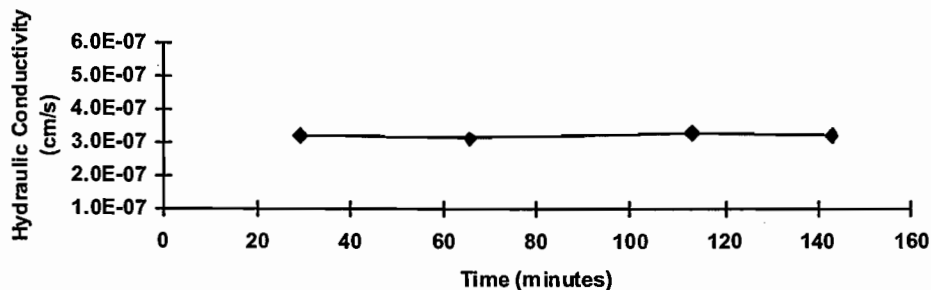
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	2.251	Weight (lbs):	2.277	Permeant Liquid:	Water
Sample Length (in):	4.685	Sample Length (in):	4.685	Test Method:	C
Sample Diameter (in):	3.004	Sample Diameter (in):	3.004	Saturation (%):	98
Area (in <sup>2</sup> ):	7.087	Area (in <sup>2</sup> ):	7.087	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	33.20	Volume (in <sup>3</sup> ):	33.20	Optimum Moisture Content (%):	N/A
Moisture Content (%):	28.7	Moisture Content (%):	30.2		
Dry Unit Weight (pcf):	91.0	Dry Unit Weight (pcf):	91.0		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$3.2 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 23 days when it was set up in the permeability cell on 4/20/2011.

Reviewed by:

Date:

4/26/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-102A-3-11

ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE : 4/26/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 4/13/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S102A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 4-7, Cast 3/28/2011  
Sample Type: 3x6 cylinder

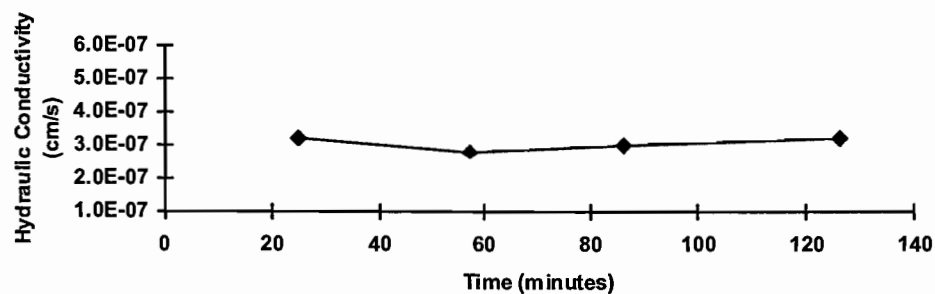
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	2.265	Weight (lbs):	2.297	Permeant Liquid:	Water
Sample Length (in):	4.685	Sample Length (in):	4.685	Test Method:	C
Sample Diameter (in):	3.004	Sample Diameter (in):	3.004	Saturation (%):	98
Area (in <sup>2</sup> ):	7.087	Area (in <sup>2</sup> ):	7.087	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	33.20	Volume (in <sup>3</sup> ):	33.20	Optimum Moisture Content (%):	N/A
Moisture Content (%):	27.2	Moisture Content (%):	28.9		
Dry Unit Weight (pcf):	92.7	Dry Unit Weight (pcf):	92.7		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$3.1 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 23 days when it was set up in the permeability cell on 4/20/2011.

Reviewed by:

Date:

4/26/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-103A-3-11

ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE : 4/26/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 4/16/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S103A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 13-17, Cast 3/26/2011  
Sample Type: 3x6 cylinder

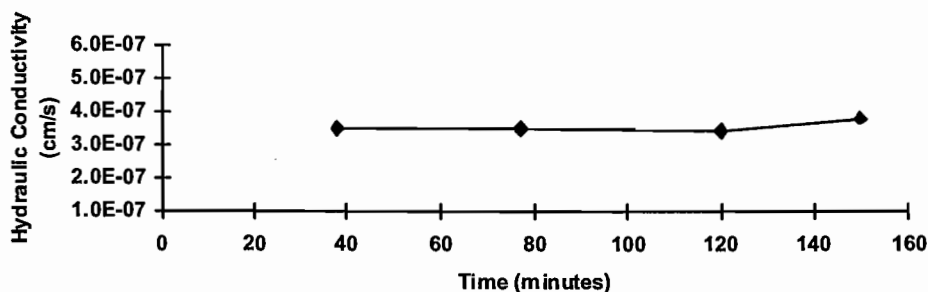
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	2.009	Weight (lbs):	2.040	Permeant Liquid:	Water
Sample Length (in):	4.449	Sample Length (in):	4.449	Test Method:	C
Sample Diameter (in):	3.004	Sample Diameter (in):	3.004	Saturation (%):	98
Area (in <sup>2</sup> ):	7.087	Area (in <sup>2</sup> ):	7.087	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	31.53	Volume (in <sup>3</sup> ):	31.53	Optimum Moisture Content (%):	N/A
Moisture Content (%):	37.7	Moisture Content (%):	39.9		
Dry Unit Weight (pcf):	80.0	Dry Unit Weight (pcf):	79.9		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$3.6 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 25 days when it was set up in the permeability cell on 4/20/2011.

Reviewed by:

Date:

4/26/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-104A-3-11 ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE : 4/26/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 4/13/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S104A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 5-16, Cast 3/29/2011  
Sample Type: 3x6 cylinder

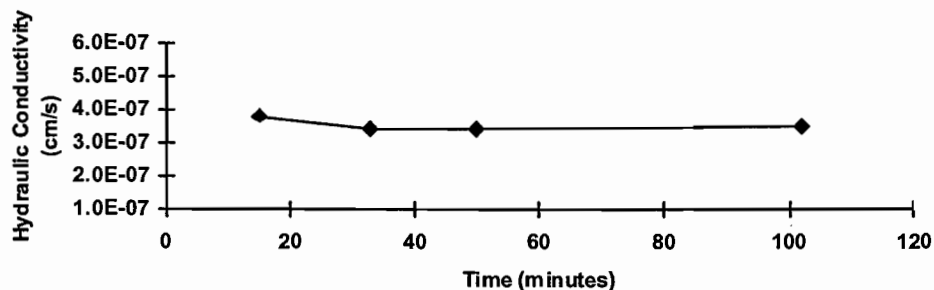
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	1.985	Weight (lbs):	2.010	Permeant Liquid:	Water
Sample Length (in):	4.370	Sample Length (in):	4.370	Test Method:	C
Sample Diameter (in):	3.004	Sample Diameter (in):	3.004	Saturation (%):	98
Area (in <sup>2</sup> ):	7.087	Area (in <sup>2</sup> ):	7.087	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	30.97	Volume (in <sup>3</sup> ):	30.97	Optimum Moisture Content (%):	N/A
Moisture Content (%):	36.9	Moisture Content (%):	38.6		
Dry Unit Weight (pcf):	80.9	Dry Unit Weight (pcf):	80.9		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$3.5 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 22 days when it was set up in the permeability cell on 4/20/2011.

Reviewed by:

Date:

4/26/11



# ATLANTIC TESTING LABORATORIES

## HYDRAULIC CONDUCTIVITY TEST AT1573SL-105A-3-11

ASTM D 5084(using a flexible wall permeameter)

### PROJECT INFORMATION

CLIENT: AECOM  
PROJECT: NGP Site, Norwich, New York

DATE: 4/26/2011  
DELIVERED BY: J. Mikula  
DATE DELIVERED: 4/13/2011

### SAMPLE IDENTIFICATION

ATL Sample No.: AT1573S105A  
Sample Location: Grout Column  
Soil Classification: N/A

Client Identification: 11-29, Cast 3/30/2011  
Sample Type: 3x6 cylinder

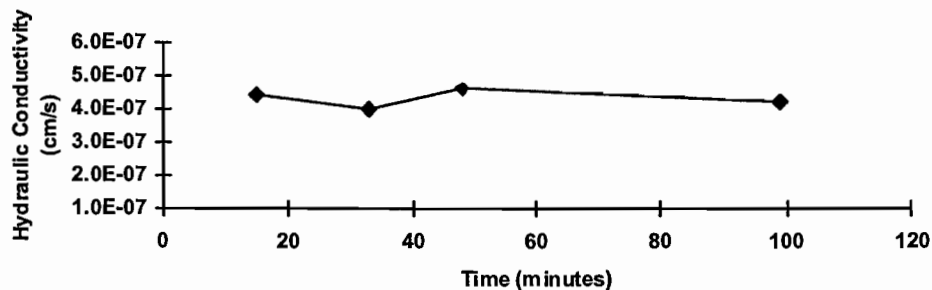
### SAMPLE INFORMATION

INITIAL		FINAL		PARAMETERS	
Weight (lbs):	1.882	Weight (lbs):	1.903	Permeant Liquid:	Water
Sample Length (in):	4.173	Sample Length (in):	4.173	Test Method:	C
Sample Diameter (in):	3.004	Sample Diameter (in):	3.004	Saturation (%):	98
Area (in <sup>2</sup> ):	7.087	Area (in <sup>2</sup> ):	7.087	Maximum Dry Density (pcf):	N/A
Volume (in <sup>3</sup> ):	29.57	Volume (in <sup>3</sup> ):	29.57	Optimum Moisture Content (%):	N/A
Moisture Content (%):	39.5	Moisture Content (%):	41.0		
Dry Unit Weight (pcf):	78.8	Dry Unit Weight (pcf):	78.8		

### TEST DATA

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
61	50	52	9	11	2	$4.3 \times 10^{-7}$

### HYDRAULIC CONDUCTIVITY vs. TIME



### REMARKS

Note: The sample age was 21 days when it was set up in the permeability cell on 4/20/2011.

Reviewed by:

Date:

4/26/11

## **Appendix I**

### **NYSDEC Approval Letter**

# NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Environmental Remediation, Remedial Bureau C  
625 Broadway, 11th Floor, Albany, NY 12233-7014  
P: (518) 402-9662 | F: (518) 402-9679  
www.dec.ny.gov

July 8, 2016

Mr. Tracy Blacizek  
New York State Electric and Gas  
Corporate Drive – Kirkwood Industrial Park  
PO Box 5224  
Binghamton, New York 13902

Re: Remedial Design Report Off-site Target Area 100% Submittal  
Norwich Former MGP Site  
Norwich, Chenango County, New York  
Site No. 709011

Dear Mr. Blazicek:

The New York State Department of Environmental Conservation and New York State Department of Health (Departments) have reviewed the "Remedial Design Report Off-site Target Area 100% Submittal" for the Norwich Former MPG Site, dated March 18, 2016.

Based on the review, the Department has determined that the report satisfactorily addressed the Department's comments in a letter dated March 3, 2016. The report is hereby approved with the following comment:

Please remove the Citizen Participation Plan from the Remedial Design and submit as a separate document.

Please submit the final copy of the Remedial Design which is signed and stamped by a professional engineer licensed to practice in New York State to this office and appropriate distribution list within thirty (30) days of this letter.

Please contact me at 518-402-9662 if you have any questions.

Sincerely,



Sarah Saucier, P.E.  
Environmental Engineer 1  
Remedial Section C  
Division of Environmental Remediation



Department of  
Environmental  
Conservation



Ec: J. Ruspantini, NYSEG  
S. Underhill, AECOM  
S. McDonough, AECOM  
M. Doroski, DOH  
M. Schuck, DOH  
A. Omorogbe

## **Appendix J**

### **Biosolve™ Product Information**

## Material Safety Data Sheet

Page 1 of 5

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### Section 1 – Chemical Products and Company Identification

---

**Chemical Products:** BioSolve® Pinkwater®      **Date Prepared:** 01/01/2013  
BioSolve® Clear  
BioSolve® NPLD

**Manufacturer:** The BioSolve Company  
329 Massachusetts Avenue  
Lexington, MA 02420 USA

**Emergency Phone:** (800) 225-3909      US, Canada, Mexico and Puerto Rico  
+1 (781) 482-7900      All other locations

---

### Section 2 – Composition/Information on Ingredients

---

**BioSolve Pinkwater CAS#** 138757-63-8      Formulation with nonionic surfactants  
**Concentration:** ~32% active ingredients

BioSolve products contain no caustic, d-limonene or hydrocarbon solvents.

These products do not contain any hazardous ingredients as defined by CERCLA, Massachusetts Right to Know Law and California Prop 65. All ingredients are TSCA compliant.

---

### Section 3 – Hazards Identification

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**Overview:** Non-flammable, non-hazardous, water-based surfactant formulation

**Appearance:** Dyed: Deep red liquid  
Clear: light golden liquid

**Odor:** Mild, pleasant odor; BioSolve NPLD has no added fragrance

#### Potential Health Effects

**Eye Contact:** May cause mild, temporary irritation and redness

**Skin Contact:** May cause temporary irritation, redness and drying of the skin

**Inhalation:** Inhalation of concentrated vapors resulting from heating or spraying in confined or poorly ventilated areas may cause irritation of nose and throat

**Ingestion:** May cause abdominal discomfort, nausea or diarrhea

Pre-existing skin and eye disorders may be aggravated by contact

## Material Safety Data Sheet

Page 2 of 5

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### Section 4 – First Aid Measures

---

**Eyes:** Immediately flush eyes with plenty of water for at least 15 minutes. Hold eyelids apart while flushing to rinse entire surface of eye and lids with water. Seek medical attention.

**Skin:** Rinse exposed area and wash with mild soap and water for several minutes. Seek medical attention if irritation develops.

**Ingestion:** Seek medical attention.

**Inhalation:** None considered necessary.

**Other Instructions:** None.

---

### Section 5 – Fire Fighting Measures

---

**Flash Point:** Not applicable

**Flammability Limits:**

Lower – Not applicable

Upper – Not applicable

**Special Protective Equipment for Firefighters:** None necessary

**Unusual Fire or Explosive Hazards:** None

**Solvent for Cleanup:** Water

---

### Section 6 – Accidental Release Measures

---

In case of accidental release, breakage or leakage: Eliminate or contain source with inert material, such as sand, earth, absorbent pads, etc. Transfer liquid to suitable containers for recovery, re-use or disposal. Wipe up or mop up using water. Hard surfaces (e.g., floors, driveways) may be slippery; use care to avoid falling.

Rinse area with water. Avoid discharging to natural streams and lakes. Note: Always check with local regulations before discharging effluent to storm drains or sewers.

Avoid prolonged contact with skin, eyes or clothing.

## Material Safety Data Sheet

Page 3 of 5

### Section 7 – Handling and Storage

**Handling:** Minimize periods of exposure to extreme temperatures. Keep from freezing. If frozen, separation may occur; thaw and stir thoroughly prior to use.

**Storage:** Recommended storage temperature: 35° – 120° F (1° – 48° C)

**Shelf Life:** If unopened, more than 10 years

### Section 8 – Exposure Controls / Personal Protection

**Eyes/Face:** Safety glasses; chemical goggles or face shield recommended when spraying to protect against backsplash and drift

**Skin:** Rubber or latex gloves recommended

**Respiratory:** None required, except if application results in significant misting of product. If so, use MSHA/NIOSH approved half mask air purifying respirator.

**Footwear:** No special requirements

**Clothing:** No special requirements; launder clothing if contaminated

**Other:** Eye wash station

**Engineering Controls:** For indoor use, normal room ventilation is expected to be satisfactory

### Section 9 – Physical and Chemical Properties

**Appearance:** Light golden, unless dyed deep red

**Odor:** Mild, pleasant fragrance (except BioSolve NPLD, which has no added fragrance)

**Concentration:** ~32% active ingredients as sold

<b>Boiling Point</b>	265°F/129°C	<b>Vapor Pressure mm/Hg</b>	Not applicable
<b>Melting/Freezing Point</b>	28°F/-2°C	<b>Vapor Density (Air=1)</b>	Not applicable
<b>Surface Tension 6% sol'n</b>	29 Dyne/cm @25°C	<b>Viscosity (concentrate)</b>	350 centipoise
<b>Reactivity with Water</b>	None	<b>Viscosity (6% solution)</b>	1.5 centipoise
<b>Evaporation Rate</b>	Not determined	<b>Solubility in Water</b>	Complete
<b>Specific Gravity</b>	1.01 gms/cc	<b>VOC Content</b>	Not determined
	8.43 lbs/U.S. gal	<b>pH</b>	9.1 +/- 0.3

## Material Safety Data Sheet

Page 4 of 5

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### Section 10 – Stability and Reactivity

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<b>Stability:</b>	Stable
<b>Conditions to Avoid:</b>	Prolonged exposure to heat may cause product degradation. Freezing conditions should also be avoided as discussed in Section 7.
<b>Incompatible Materials:</b>	Normally unreactive. However, avoid strong alkalis at high temperature, strong acids, strong oxidizing agents and materials with reactive hydroxyl compounds. These compounds could damage the product and reduce its effectiveness during application.
<b>Hazardous Decomposition Products:</b>	None
<b>Hazardous Polymerization:</b>	Will not occur.

---

### Section 11 – Toxicological Information

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<b>Health Effects:</b>	No adverse health effects expected if product handled in accordance with the Material Safety Data Sheet. See Section 3 for discussion of potential Health Effects
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### Section 12 – Ecological Considerations

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**Avoid contaminating waterways;** at high concentrations, such as from undiluted concentrate, BioSolve Pinkwater will interfere with fish respiration and can be toxic to marine organisms

**Aquatic Toxicity:** When used as directed, at concentrations ranging from 1% to 8%, BioSolve Pinkwater has low adverse impact on aquatic organisms

Menidia beryllina: LC50 = 247 ppm @3% solution BioSolve Pinkwater

Mysidopsis bahia: LC50 = 185 ppm @3% solution BioSolve Pinkwater

**Chemical Fate:** Biodegradable under aerobic conditions

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### Section 13 - Disposal

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This product has been evaluated for RCRA characteristics and does not meet the criteria of a hazardous waste if disposed of in its original form. However, the intended use of this product as a remediation and/or surface washing agent may render the effluent hazardous due to the presence of emulsified or dispersed hydrocarbons and should be disposed of accordingly. Note: Always obtain approval from local and federal regulatory agencies prior to discarding this product into public sewers or storm drains.

## Material Safety Data Sheet

Page 5 of 5

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### Section 14 – Transportation Information

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USDOT Freight Class 55 (Liquid Cleaning Compound, Non-Hazardous)

This product is not regulated by USDOT or Canadian TDG when shipped domestically by land.

North American Industry Classification System (NAICS) # 325613

U.S. ITC, Harmonized Tariff Schedule B Classification: 3402.90.30.00

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### Section 15 – Regulatory Information

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The information herein is presented in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied, is given. Regulatory requirements are subject to change and may differ from one location to another; it is the buyer's responsibility to ensure that its activities comply with federal, state or provincial, and local laws.

This product is considered non-hazardous as defined by CERCLA, according to OSHA, Massachusetts Right to Know Law and California Prop 65. BioSolve products are TSCA compliant.

---

### Section 16 – Other Information

---

#### National Fire Protection Association Ratings

<b>Health:</b>	<b>1</b> (Caution: May be Irritating)
<b>Flammability:</b>	<b>0</b>
<b>Reactivity:</b>	<b>0</b>
<b>Personal Protection:</b>	<b>Gloves, Safety glasses</b>

BioSolve Pinkwater is listed on the US EPA's NCP Product Schedule (#SW-20). This listing does not mean that EPA approves, recommends, licenses, certifies or authorizes the use of BioSolve Pinkwater on any oil discharge. This listing means only that data has been submitted to EPA as required by Subpart J of the National Contingency Plan, Section 300.915.

For more information, visit: [www.biosolve.com](http://www.biosolve.com)

## **Appendix K**

### **Erosion and Sediment Controls**





# Final Phase 1 Remedial Design Report Erosion and Sediment Control Plan

**Site:**

Norwich Former Manufactured Gas Plant Off-site Target Area  
Front Street  
Norwich, Chenango County, New York

**Submitted to:**

New York State Department of Environmental Conservation  
Department of Environmental Remediation  
625 Broadway  
Albany, NY 12233-7012

**Prepared for:**

New York State Electric & Gas Company  
James A. Carrigg Center, 18 Link Drive  
P.O. Box 5224  
Binghamton, New York 13902-5224

**Prepared by:**

AECOM  
40 British American Blvd.  
Latham, New York 12110

July 2016

AECOM Project No. 60345362.1



# Final Phase 1 Remedial Design Report Erosion and Sediment Control Plan

**Site:**

Norwich Former Manufactured Gas Plant  
Off-site Target Area  
Front Street  
Norwich, Chenango County, New York

Author: Scott T. McDonough

Title: Environmental Engineer

**Submitted to:**

NYSDEC  
Department of Environmental Remediation  
625 Broadway  
Albany, NY 12233-7012

Date: 7/11/2016

Reviewer: Scott Underhill, P.E.

**Prepared for:**

New York State Electric & Gas Company  
James A. Carrigg Center, 18 Link Drive  
P.O. Box 5224  
Binghamton, New York 13902-5224

Title: Project Manager

Date: 7/11/2016

**Prepared by:**

AECOM  
40 British American Blvd.  
Latham, New York 12110

July 2016

AECOM Project No. 60345362.1

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## 1.0 INTRODUCTION

New York State Electric & Gas Corporation (NYSEG) is preparing to implement a Remedial Action Design involving the excavation and In-Situ Solidification (ISS) of coal tar impacted soil associated with the Norwich former manufactured gas plant site located in Norwich, Chenango County, New York. This *Erosion and Sediment Control Plan* will detail planned erosion and sediment control activities and practices that will be implemented for this remediation project. This *Erosion and Sediment Control Plan* is designed to be used in conjunction with a New York State Department of Environmental Conservation (NYSDEC) approved *Remedial Design* with regards to specific project objectives and field sampling activities.

The proposed *Remedial Action Design* will involve excavation and ISS of coal tar impacted soil and debris. The *Remedial Action Design* will be conducted according to the requirements of an Order on Consent between NYSEG and the NYSDEC. The Order on Consent is a legal document that defines the obligations of each party for conducting site investigations and remediations. The Order on Consent requires that all work by NYSEG at the site be performed under the oversight of the NYSDEC and the New York State Department of Health (NYSDOH).

The NYSEG Norwich Former MGP site (Site) is located at 24 Birdsall Street, in the City of Norwich, Chenango County, New York. The former facility is approximately one acre in area and is bounded to the north by a plaza with retail shops, to the east by a NYSEG substation and private residences, to the south by the former Aero Products property (now owned by NYSEG), and to the west by the Lackawanna railroad tracks. The former plant is located on Birdsall Street, in Chenango River valley, west of the Chenango River and Rt. 32, south of Rt. 23, and east of Rt. 12.

The Site previously occupied approximately one acre of land located at 24 Birdsall Street. In the years following cessation of gas production, former MGP structures were razed and subsequently NYSEG used the site for equipment storage. Presently, much of the property is paved with asphalt or covered with compacted gravel. A NYSEG electric substation exists on the eastern portion of the site.

The northern part of the Site has been developed as a shopping plaza with retail shops. NYSEG purchased the former Aero Products facility located to the south and used the building for storage for several years. During the summer of 2006, NYSEG demolished the former Aero Products building. The off-site area that extends to the south of the former Aero Products building is comprised of mostly residential housing. NYSEG has purchased property at 37 and 41 Front Street and razed the structures located on these properties to allow for the ISS of the underlying soils.

The off-site target area, the subject of this report, occupies approximately 0.25 acres of land immediately south of the former MGP. The off-site target area is bounded by residential properties to the south and east, Lackawanna Railroad/Baldwin Street to the west and to the north by Front Street.

## **2.0 SITE PREPARATION**

All erosion control measures shall be installed prior to clearing and grubbing of the site, including the first phase of construction. These measures shall consist of installing silt fence and hay bales. The silt fence and hay bales shall be installed around the entire project site as shown in the *Remedial Design*, Design Drawings. This system will reduce the velocity of runoff from the site.

All permanent on-site storm water management facilities (i.e. outfall pipes and the storm water inlets) shall be plugged and covered prior to the start of clearing operations to minimize the amount of sediment from impacting the waterway. All storm water inlets that are made operable during construction shall be protected so that sediment-laden water cannot enter the conveyance system without first being filtered or otherwise treated to remove sediment.

### **3.0 REMEDIAL ACTIVITIES**

The Contractor shall provide temporary drainage to relieve areas that may cause damage to the roadways, and erosion protection during construction. All erosion and sedimentation control devices shall be installed prior to any land disturbance activities.

#### **3.1 Earth Moving Activities**

All earth moving activities will incorporate best management practices to minimize accelerated erosion and sedimentation. Cut and fill slopes shall be designed and constructed in such a manner that erosion will be minimized. All earth moving activities will be conducted in such a manner as to minimize the extent and duration of disturbed land.

Slopes that are found to be eroding excessively within one year of permanent stabilization shall be provided with additional slope stabilization measures until the problem is corrected.

#### **3.2 General Housekeeping**

All heavy equipment shall be decontaminated in one of the on-site truck and equipment decontamination pads prior to going off site. These equipment pads shall be constructed such that any runoff or water draining out of the removed material shall be collected in the sump area.

Where construction vehicle access routes intersect paved public roads, provisions shall be made to minimize the transport of sediment onto the paved surface. Where sediment and excavated soils are transported onto a public road surface, the road shall be cleaned thoroughly as soon as soil accumulations appear. Sediment and soil residuals shall be removed from the road by shoveling or sweeping and transported to an on-site material handling area. Street washing shall be allowed only after sediment is removed in this manner.

Construction traffic shall be limited to access roads. All traffic is prohibited from crossing drainage swales unless where absolutely necessary.

#### **3.3 Storm Water Management**

As shown on the *Remedial Design*, Design Drawings, hay bales and silt fence shall be placed around the entire site. The Contractor shall ensure storm water will not be permitted to flow onto or from the site.

#### **3.4 Operations and Maintenance**

The Subcontractor shall be responsible for the installation and maintenance of all erosion and sedimentation control practices.

In general, all erosion and sedimentation control measures shall be checked daily and after each rainfall, whichever is most frequent, and shall be cleaned and repaired according to the following schedule:

- The storm water inlets and outfall pipes will be checked regularly to ensure that they are still covered and sediment is not building up around the openings. If necessary, corrective action shall be taken immediately.
- The sump areas shall be cleaned out when the level of sediment buildup is half way up the riser pipe.

- Erosion and sediment control shall be checked regularly for undermining or deterioration and buildup or clogging with sediment. If necessary, corrective action shall be taken immediately.

All temporary erosion and sedimentation control measures shall be removed within 30 days after final site stabilization or after the temporary measures are no longer necessary. Trapped sediment and the disturbed soil areas resulting from the deposition caused by the temporary control measures shall be permanently stabilized to prevent further erosion and sedimentation.

All erosion and sedimentation control measures shall be maintained until the permanent stabilization measures are completed

#### **4.0 SITE RESTORATION**

All disturbed areas will be stabilized as soon as possible after the final grade has been achieved for the project site. As shown on the *Remedial Design*, Design Drawings, the site will be restored with a combination of vegetative cover and stone; those areas covered with vegetation will have a uniform coverage and density of at least 80% perennial vegetation.

A silt fence shall be installed downgradient of all reseeded areas. The silt fence shall remain in place until healthy vegetation is established.

##### **4.1 Operations and Maintenance**

Periodic inspections and required maintenance shall be conducted, especially after each significant storm event. The Subcontractor shall be responsible for the installation and maintenance of all erosion and sedimentation control practices.

- All seeded areas shall be checked regularly to see that a good stand of grass is maintained. Areas should be fertilized and reseeded as necessary.
- All temporary erosion and sedimentation control measures shall be removed and disposed of within 30 days after the final site stabilization is achieved and vegetation is established.
- Trapped sediment and the disturbed soil areas resulting from the deposition caused by the temporary control measures shall be permanently stabilized to prevent further erosion and sedimentation.



## **5.0 REFERENCES**

NYSDEC, 2005. New York state Standards and Specifications for Erosion and Sediment Control.  
Prepared by: NYS Soil and Water Conservation Committee for New York State Department of  
Environmental Conservation, August 2005.

## **Appendix L**

### **Boring Logs**

# NO-DP01

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 4/25/2005

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 1004.28 ft. above MSL

WELL ELEVATION: NA

OUTER CASING ELEVATION: NA

DEPTH TO WATER: NA

BOREHOLE DEPTH: 24 ft. below grade

WEATHER: Rainy

GEOLOGIST: Lara Gray

DEPTH (ft.)	SAMPLE INTERVAL (ft.)	% RECOVERY	PID (ppm)	ANALYTICAL SAMPLE	SOIL DESCRIPTION and LITHOLOGIC SYMBOL	WELL CONSTRUCTION	REMARKS
0	0-4	100	0.0		ASPHALT		
-1			0.0		FILL: Dry, light brown silt, sand, gravel and concrete pieces		
-2			0.0				
-3			0.0				
-4	4-8	100	0.7		GRAVEL: Wet, loosely packed gravel		
-5			12		SAND AND SILT: Moist to wet, brown, fine sand and silt with some gravel and rock clasts. Slight tar-like material (TLM) at 6.1'.		
-6							
-7							
-8	8-12	60					
-9			0.0				
-10			0.0				
-11			36				
-12			100		SAND AND SILT: As above with black staining and moderate tar-like odor		
-13							

# NO-DP01

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 4/25/2005

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 1004.28 ft. above MSL

WELL ELEVATION: NA

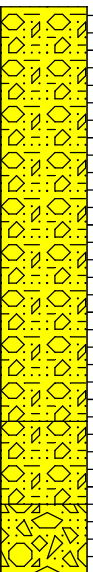

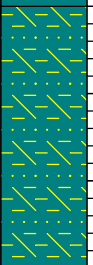
OUTER CASING ELEVATION: NA

DEPTH TO WATER: NA

BOREHOLE DEPTH: 24 ft. below grade

WEATHER: Rainy

GEOLOGIST: Lara Gray

DEPTH (ft.)	SAMPLE INTERVAL (ft.)	% RECOVERY	PID (ppm)	ANALYTICAL SAMPLE	SOIL DESCRIPTION and LITHOLOGIC SYMBOL	WELL CONSTRUCTION	REMARKS
-14	12-16	50	225		GRAVEL AND SAND: Wet, brown, coarse sand and gravel with angular rock clasts. Moderate odor, sheen, and substantial NAPL globules present.		
-15			125	14-15			
-16			150	15-16			
-17	16-20	40	50		GRAVEL AND SAND: As above with less NAPL present		
-18			200				
-19			150				
-20	20-24	100	100		GRAVEL: Wet, brown, small to medium gravel, rounded and poorly sorted. Moderate odor, sheen, and NAPL globules present		
-21			150		CLAY AND SAND: Moist, reddish-brown, compact clay with fine sand		
-22			20				
-23			10		CLAY AND SAND: Moist, light gray clay with fine sand. Slight sheen on outside from gravel layer above.		
-24			10	23-24			

# NO-DP02

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 4/25/2005

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 1004.35 ft. above MSL

WELL ELEVATION: NA

OUTER CASING ELEVATION: NA

DEPTH TO WATER: NA

BOREHOLE DEPTH: 24 ft. below grade

WEATHER: Cloudy with rain

GEOLOGIST: Lara Gray

DEPTH (ft.)	SAMPLE INTERVAL (ft.)	% RECOVERY	PID (ppm)	ANALYTICAL SAMPLE	SOIL DESCRIPTION and LITHOLOGIC SYMBOL	WELL CONSTRUCTION	REMARKS
0	0-4	100	2.0		ASPHALT		
-1			10		FILL: Dry, light brown silt with gravel and concrete pieces		
-2			10				
-3			12				
-4	4-8	95	8.0				
-5			28		FILL: Dry to moist, medium brown silt and fine sand with gravel and some coal-like material (CLM) with a slight odor at 5.6'		
-6			50				
-7			18				
-8	8-12	75	6.0				
-9			1.0		SAND AND SILT: Moist, dark brown silt, sand and gravel		
-10			160				
-11			130				
-12			5.0		SAND AND GRAVEL: Moist, brown sand and gravel with some black staining and tar-like odor		
-13			25				

# NO-DP02

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 4/25/2005

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 1004.35 ft. above MSL

WELL ELEVATION: NA

OUTER CASING ELEVATION: NA

DEPTH TO WATER: NA

BOREHOLE DEPTH: 24 ft. below grade

WEATHER: Cloudy with rain

GEOLOGIST: Lara Gray

DEPTH (ft.)	SAMPLE INTERVAL (ft.)	% RECOVERY	PID (ppm)	ANALYTICAL SAMPLE	SOIL DESCRIPTION and LITHOLOGIC SYMBOL	WELL CONSTRUCTION	REMARKS
-14	12-16	60	30		SAND AND GRAVEL: As above with moderate sheen, odor and NAPL globules		
-15			25	15-16			
-16			60				
-17			150				
-18	16-20	50	50	18-19			
-19			100				
-20			2.0				
-21			2.0		SAND AND GRAVEL: Wet, brown sand and gravel with sheen		
-22	20-24	75	1.0		CLAY AND SAND: Moist, reddish-brown to gray clay with fine sand		
-23			0.0	23-24			
-24							

# NO-DP03

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 4/25/2005

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: NA

WELL ELEVATION: NA

OUTER CASING ELEVATION: NA

DEPTH TO WATER: NA

BOREHOLE DEPTH: 28 ft. below grade

WEATHER: Cool and rainy

GEOLOGIST: Lara Gray

DEPTH (ft.)	SAMPLE INTERVAL (ft.)	% RECOVERY	PID (ppm)	ANALYTICAL SAMPLE	SOIL DESCRIPTION and LITHOLOGIC SYMBOL	WELL CONSTRUCTION	REMARKS
0	0-4	90	0.0		ASPHALT		
-1			0.0		FILL: Dry, light brown silt, sand, gravel and concrete pieces		
-2			0.0				
-3			0.0				
-4	4-8	50	0.0		FILL: Dry to moist, medium brown, fine to medium sand and gravel with a little coal-like material (CLM) and iron staining		
-5			0.0				
-6			0.0				
-7			0.0				
-8	8-12	60	0.0		SAND: Moist, orange and brown, fine sand with some iron staining		
-9			0.0		SAND AND SILT: Moist, dark brown silt and fine sand with trace clay		
-10			0.0				
-11			0.0				
-12	12-16	40	25		SAND AND GRAVEL: Moist, brown, fine sand with a little gravel		
-13			5.0		GRAVEL AND SAND: Moist, brown sand and gravel with a few rock clasts and a slight odor with black staining		
-14			51				

# NO-DP03

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 4/25/2005

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: NA

WELL ELEVATION: NA

OUTER CASING ELEVATION: NA

DEPTH TO WATER: NA

BOREHOLE DEPTH: 28 ft. below grade

WEATHER: Cool and rainy

GEOLOGIST: Lara Gray

DEPTH (ft.)	SAMPLE INTERVAL (ft.)	% RECOVERY	PID (ppm)	ANALYTICAL SAMPLE	SOIL DESCRIPTION and LITHOLOGIC SYMBOL	WELL CONSTRUCTION	REMARKS
-15			115	15-16	GRAVEL: Wet gravel and large rock clasts with a few sand lenses. Moderate tar-like odor, sheen, and NAPL globules present.		
-16			55				
-17							
-18	16-20	30	10		GRAVEL AND SAND: Wet, medium to coarse, loosely packed sand and gravel with tar-like odor and sheen		
-19			2.0				
-20			150				
-21							
-22	20-24	50			GRAVEL: Wet, small, rounded gravel		
-23				23-24	GRAVEL AND SAND: Wet sand and gravel with moderate sheen and NAPL globules present. Substantial reddish NAPL with a very strong odor present from 23.75'-24'.		
-24							
-25							
-26	24-28	100			CLAY AND SAND: Moist, reddish-brown to light gray clay with fine sand. NAPL on outside from layer above.		
-27							
-28							



# NO-DP04A

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 4/26/2005

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 1004.16 ft. above MSL

WELL ELEVATION: NA

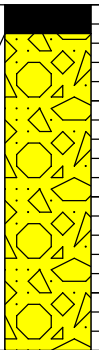
OUTER CASING ELEVATION: NA

DEPTH TO WATER: NA

BOREHOLE DEPTH: 3.7 ft. below grade

WEATHER: Warm, sunny, breezy

GEOLOGIST: Lara Gray

DEPTH (ft.)	SAMPLE INTERVAL (ft.)	% RECOVERY	PID (ppm)	ANALYTICAL SAMPLE	SOIL DESCRIPTION and LITHOLOGIC SYMBOL	WELL CONSTRUCTION	REMARKS
0 -1 -2 -3	0-3.7	95	0.0 0.0 0.2 0.0		ASPHALT  FILL: Dry, light brown silt, sand, gravel and concrete pieces. Refusal at 3.7'. 		

# NO-DP04B

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 4/26/2005

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 1004.16 ft. above MSL

WELL ELEVATION: NA

OUTER CASING ELEVATION: NA

DEPTH TO WATER: NA

BOREHOLE DEPTH: 3.6 ft. below grade

WEATHER: Warm, sunny, breezy

GEOLOGIST: Lara Gray

DEPTH (ft.)	SAMPLE INTERVAL (ft.)	% RECOVERY	PID (ppm)	ANALYTICAL SAMPLE	SOIL DESCRIPTION and LITHOLOGIC SYMBOL	WELL CONSTRUCTION	REMARKS
0	0-3.6	100	0.0		ASPHALT		
-1			0.0		FILL: Dry, light brown silt, sand, gravel and concrete pieces. Slight tar-like odor and black staining at 3.6'. Refusal at 3.6'.		
-2			0.0				
-3			0.0				

# NO-DP04C

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 4/26/2005

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 1004.19 ft. above MSL

WELL ELEVATION: NA

OUTER CASING ELEVATION: NA

DEPTH TO WATER: NA

BOREHOLE DEPTH: 24 ft. below grade

WEATHER: Warm, sunny, breezy

GEOLOGIST: Lara Gray

DEPTH (ft.)	SAMPLE INTERVAL (ft.)	% RECOVERY	PID (ppm)	ANALYTICAL SAMPLE	SOIL DESCRIPTION and LITHOLOGIC SYMBOL	WELL CONSTRUCTION	REMARKS
0			0.1		ASPHALT		
-1			0.2		FILL: Dry, light to medium brown silt, sand, gravel and concrete pieces. Very slight odor at 4'.		
-2	0-4	85	0.1				
-3			4.0				
-4			2.0				
-5			1.2				
-6	4-8	50	0.3		SILT: Moist, medium brown silt with slight black staining and odor		
-7			0.2				
-8			0.3		SAND AND SILT: Moist, medium brown, fine sand and silt with some gravel and iron staining		
-9			2.6				
-10	8-12	50	1.1		SAND AND SILT: As above with slight black staining and sheen at 12'. Wet at 12'.		
-11			1.2				
-12			2.8				
-13							

# NO-DP04C

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 4/26/2005

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 1004.19 ft. above MSL

WELL ELEVATION: NA

OUTER CASING ELEVATION: NA

DEPTH TO WATER: NA

BOREHOLE DEPTH: 24 ft. below grade

WEATHER: Warm, sunny, breezy

GEOLOGIST: Lara Gray

DEPTH (ft.)	SAMPLE INTERVAL (ft.)	% RECOVERY	PID (ppm)	ANALYTICAL SAMPLE	SOIL DESCRIPTION and LITHOLOGIC SYMBOL	WELL CONSTRUCTION	REMARKS
-14	12-16	60	4.0		GRAVEL AND SAND: Wet, brown, loosely packed gravel and coarse sand with a sheen and very small NAPL globules		
-15			4.0				
-16			2.5				
-17	16-20	65	20				
-18			15		GRAVEL AND SAND: Wet, brown, fine to medium sand with gravel. Substantial NAPL globules present.		
-19			32	18-19			
-20			25				
-21	20-24	60	10				
-22			1.5				
-23			0.5		GRAVEL: Wet rounded gravel		
-24			0.3	23-24	CLAY AND SAND: Moist, gray clay with fine sand		

# NO-DP05

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 10/26/2004

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 1004.30 ft. above MSL

WELL ELEVATION: N/A

OUTER CASING ELEVATION: N/A

DEPTH TO WATER: N/A

BOREHOLE DEPTH: 20 ft. below grade

WEATHER: Not recorded

GEOLOGIST: Pete DeClercq

DEPTH (ft.)	SAMPLE INTERVAL (ft.)	% RECOVERY	PID (ppm)	ANALYTICAL SAMPLE	SOIL DESCRIPTION and LITHOLOGIC SYMBOL	WELL CONSTRUCTION	REMARKS
0	0-4	78	0.0		FILL: Dry, brown silt		
-1			0.0				
-2			0.0				
-3			0.0				
-4	4-8	55	0.0		FILL: Moist, brown silt with sand and gravel		
-5			0.0				
-6			0.0				
-7			0.0				
-8	8-12	58	0.0		SAND AND GRAVEL: Moist to wet, brown silt with sand and gravel		
-9			2.3				
-10			26				
-11			33				
-12	12-16	55	16		FILL: Wet, brown silt, sand and gravel and NAPL globules		
-13			24				
-14			38				
-15			33	15-16			
-16	16-20	73	8.0		CLAY AND SILT: Moist, dark brown clay and interbedded silt		Driller felt clay at 17.4
-17			0.0				
-18			0.0				
-19			0.0	19-20			
-20							

# NO-DP06

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 10/27/2004

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 1004.48 ft. above MSL

WELL ELEVATION: N/A

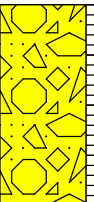

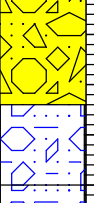
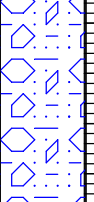
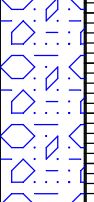
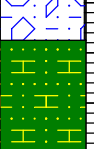
OUTER CASING ELEVATION: N/A

DEPTH TO WATER: N/A

BOREHOLE DEPTH: 24 ft. below grade

WEATHER: Not recorded

GEOLOGIST: Pete DeClercq

DEPTH (ft.)	SAMPLE INTERVAL (ft.)	% RECOVERY	PID (ppm)	ANALYTICAL SAMPLE	SOIL DESCRIPTION and LITHOLOGIC SYMBOL	WELL CONSTRUCTION	REMARKS
0	0-4	50	0.5		FILL: Dry to moist, brown silt and gravel		
-1			1				
-2			1.5				
-3			0.0				
-4	4-8	80	0.0		FILL: Dry, brown silt, sand and gravel		
-5			0.0				
-6			0.0				
-7			0.0				
-8	8-12	53	0.0		SILT, SAND AND GRAVEL: Moist, brown silt, sand and gravel with black staining and a slight odor		
-9			0.0				
-10			0.0				
-11			1.3				
-12	12-16	55	73	15-16	SILT, SAND AND GRAVEL: Wet, brown silt, sand and gravel with NAPL throughout		
-13			170				
-14			70				
-15			130				
-16	16-20	58	47				
-17			60				
-18			50				
-19			75				
-20	20-24	93		22-23	CLAY AND SILT: Moist, dark brown to gray clay and interbedded silt		
-21							
-22			6.0				
-23							
-24							

# NO-DP07

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 10/27/2004

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 1004.08 ft. above MSL

WELL ELEVATION: N/A

OUTER CASING ELEVATION: N/A

DEPTH TO WATER: N/A

BOREHOLE DEPTH: 24 ft. below grade

WEATHER: Not recorded

GEOLOGIST: Pete DeClercq

DEPTH (ft.)	SAMPLE INTERVAL (ft.)	% RECOVERY	PID (ppm)	ANALYTICAL SAMPLE	SOIL DESCRIPTION and LITHOLOGIC SYMBOL	WELL CONSTRUCTION	REMARKS
0	0-4	65	0.1.16		FILL: Moist, brown silt, sand and gravel with some debris		
-1			1.6				
-2			2.1				
-3			0.0				
-4	4-8	58	0.0		FILL: Moist, brown , sand and gravel		
-5			0.0				
-6			0.0				
-7			0.0				
-8	8-12	55	0.0				
-9			0.0				
-10			42				
-11			20				
-12	12-16	20			SILT, SAND AND GRAVEL: Wet, brown silt, sand and gravel with some NAPL		
-13					SILT, SAND AND GRAVEL: Wet, brown silt, sand and gravel with black staining		
-14					SAND AND GRAVEL: Wet, brown sand and gravel with little silt and NAPL		
-15							
-16	16-20	0			NO RECOVERY: Hole caving- No representative material sampled from 16-24' bgs		
-17							
-18							
-19							
-20	20-24	0					
-21							
-22							
-23							
-24							

Driller felt clay at 15.8'

# NO-DP08

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 10/27/2004

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 1004.29 ft. above MSL

WELL ELEVATION: N/A





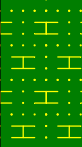
OUTER CASING ELEVATION: N/A

DEPTH TO WATER: N/A

BOREHOLE DEPTH: 16 ft. below grade

WEATHER: Not recorded

GEOLOGIST: Pete DeClercq

DEPTH (ft.)	SAMPLE INTERVAL (ft.)	% RECOVERY	PID (ppm)	ANALYTICAL SAMPLE	SOIL DESCRIPTION and LITHOLOGIC SYMBOL	WELL CONSTRUCTION	REMARKS		
0	0-4	55	0.2		FILL: Dry, brown silt with sand and gravel, very slight odor present from the surface to 0.4' bgs.				
-1			0.7						
-2			1.2						
-3			1.7						
-4	4-8	34	0.0						
-5			0.0						
-6			0.0						
-7			0.0						
-8	8-12	23	0.0						
-9			0.0						
-10			0.0						
-11			0.0						
-12	12-16	58	55	12-14	SILT, SAND AND GRAVEL: Moist, brown silt with some sand and gravel				
-13			35						
-14			16	14.7-15.7	CLAY AND SILT: Moist, brown to dark grayish brown, clay and interbedded silt				
-15			0.0						
-16									



# NO-DP09

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 10/26/2004

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 1007.18 ft. above MSL

WELL ELEVATION: N/A

OUTER CASING ELEVATION: N/A

DEPTH TO WATER: N/A

BOREHOLE DEPTH: 20 ft. below grade

WEATHER: Not recorded

GEOLOGIST: Pete DeClercq

DEPTH (ft.)	SAMPLE INTERVAL (ft.)	% RECOVERY	PID (ppm)	ANALYTICAL SAMPLE	SOIL DESCRIPTION and LITHOLOGIC SYMBOL	WELL CONSTRUCTION	REMARKS
0	0-4	50	0.0		FILL: Moist, brown silt with some sand, gravel and coal-like material		
-1			0.5				
-2			1.5				
-3			2.0				
-4	4-8	63	0.0		FILL: Moist, brown silt with sand and gravel		
-5			0.0				
-6			0.0				
-7			0.9				
-8	8-12	58	0.0		SILT: Dry, brown silt with a slight odor and staining from 7.6'-8.0'		
-9			0.0		SILT, SAND AND GRAVEL: Moist, brown silt with sand, gravel and a slight tar-like odor		
-10			13				
-11			139		SILT, SAND AND GRAVEL: Wet, brown silt with sand, gravel and a tar-like odor		
-12	12-16	60	69	15-16			
-13			65		SILT, SAND AND GRAVEL: Wet, brown silt with sand, gravel and NAPL throughout		
-14			61				
-15			72				
-16	16-20	100	65	18.8-20.0			
-17			14				
-18			4.3		SILT, SAND AND GRAVEL: Wet, brown silt with sand, gravel, and some NAPL		
-19			0.0				
-20			0.0				
-20			0.0		CLAY AND SILT: Moist to dry, dark brown to gray clay and interbedded silt		

# NO-DP10

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 10/26/2004

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 1004.07 ft. above MSL

WELL ELEVATION: N/A

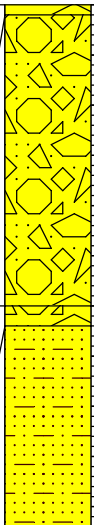
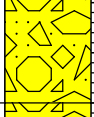
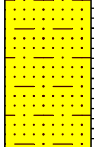
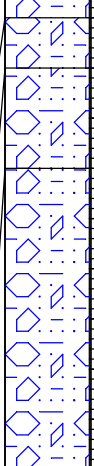
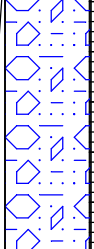
OUTER CASING ELEVATION: N/A

DEPTH TO WATER: N/A

BOREHOLE DEPTH: 24 ft. below grade

WEATHER: Not recorded

GEOLOGIST: Pete DeClercq

DEPTH (ft.)	SAMPLE INTERVAL (ft.)	% RECOVERY	PID (ppm)	ANALYTICAL SAMPLE	SOIL DESCRIPTION and LITHOLOGIC SYMBOL	WELL CONSTRUCTION	REMARKS
0	0-4	40	0.1		FILL: Dry silt, clay and sand with some organic matter		
-1			0.6		FILL: Dry silt with sand and gravel		
-2			1.1				
-3			0.0				
-4	4-8	75	0.0				
-5			0.0				
-6			0.0				
-7			0.0				
-8	8-12	48	0.0				
-9			0.0				
-10			0.0				
-11			1.3				
-12	12-16	50	1.1				
-13			834				
-14			15				
-15			32				
-16	16-20	63		19-20			
-17							
-18			7.4				
-19			4.1		SILT, SAND AND GRAVEL: Wet, brown silt, sand and gravel, with black staining and NAPL throughout		Driller felt clay at 18' bgs
-20	20-24	0.0			NO RECOVERY: Hole caving, no representative recovery		
-21							
-22							
-23							
-24							

# NO-DP11

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 10/27/2004

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 1003.10 ft. above MSL

WELL ELEVATION: N/A

OUTER CASING ELEVATION: N/A

DEPTH TO WATER: N/A

BOREHOLE DEPTH: 17.2 ft. below grade

WEATHER: Not recorded

GEOLOGIST: Pete DeClercq

DEPTH (ft.)	SAMPLE INTERVAL (ft.)	% RECOVERY	PID (ppm)	ANALYTICAL SAMPLE	SOIL DESCRIPTION and LITHOLOGIC SYMBOL	WELL CONSTRUCTION	REMARKS
0	0-4	43	0.2		FILL: Moist to wet, brown silt, sand and gravel		
-1			0.7				
-2			1.2				
-3	4-8	43					
-4							
-5							
-6	8-12	48	0.7		SILT: Moist, brown silt		
-7			0.5				
-8			0.5				
-9	12-16	58	0.0		SILT AND GRAVEL: Moist, brown silt with gravel and a very slight odor		
-10			0.0				
-11			0.0				
-12	16-17.2	12	5.3		SILT AND GRAVEL: Wet, brown silt and gravel with some staining and a moderate odor		
-13			5.0				
-14			3.8				
-15			12		SILT, SAND AND GRAVEL: Wet, brown silt, sand and gravel with a sheen and odor		
-16					SILT AND GRAVEL: Wet silt and gravel with black staining and some NAPL		
-17					CLAY: Moist, brown clay		

# NO-DP12

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 10/28/2004

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 1003.34 ft. above MSL

WELL ELEVATION: N/A

OUTER CASING ELEVATION: N/A

DEPTH TO WATER: N/A

BOREHOLE DEPTH: 24 ft. below grade

WEATHER: Not recorded

GEOLOGIST: Pete DeClercq

DEPTH (ft.)	SAMPLE INTERVAL (ft.)	% RECOVERY	PID (ppm)	ANALYTICAL SAMPLE	SOIL DESCRIPTION and LITHOLOGIC SYMBOL	WELL CONSTRUCTION	REMARKS
0	0-4	25	1.2		FILL: Moist, brown silt, sand and gravel with some coal-like material at 6.0' bgs		
-1							
-2							
-3							
-4							
-5	4-8	58	0.0				
-6			0.0				
-7			0.0				
-8			0.0				
-9	8-12	23	0.0		SILT AND GRAVEL: Moist to wet, brown silt and gravel		
-10							
-11			0.0				
-12					SILT, SAND AND GRAVEL: Wet, brown, loosely packed silt, sand and gravel		
-13	12-16	25					
-14							
-15							
-16			19		SILT, SAND AND GRAVEL: Wet, very loose, brown sand with silt and gravel with NAPL globules		
-17	16-20	25					
-18					SILT, SAND AND GRAVEL: Wet, brown silt, sand and gravel with some NAPL		
-19							
-20			2.0				
-21	20-24	48					
-22							
-23			0.0	22.6-24.0	CLAY: Dry, brown to dark brownish gray clay		Clay suspected to be at 18' below grade
-24							

# NO-DP13

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 10/26/2004

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 1002.20 ft. above MSL

WELL ELEVATION: N/A






OUTER CASING ELEVATION: N/A

DEPTH TO WATER: N/A

BOREHOLE DEPTH: 17.8 ft. below grade

WEATHER: Not recorded

GEOLOGIST: Pete DeClercq

DEPTH (ft.)	SAMPLE INTERVAL (ft.)	% RECOVERY	PID (ppm)	ANALYTICAL SAMPLE	SOIL DESCRIPTION and LITHOLOGIC SYMBOL	WELL CONSTRUCTION	REMARKS		
0	0-4	83	0.3		FILL: Dry, brown silt and gravel				
-1			0.8		SILT: Dry, dark brown silt with clay and some iron staining				
-2			1.3						
-3			1.8						
-4	4-8	75	2.3		SILT, SAND AND GRAVEL: Dry to moist, brown silt, sand and gravel				
-5			2.8						
-6			0.0						
-7			0.0						
-8	8-12	43	0.0		SILT AND GRAVEL: Wet, dark brown to gray silt and gravel with some NAPL				
-9			0.7						
-10			15						
-11			95						
-12	12-16	48		14.5-16.0	SILT, SAND AND GRAVEL: Wet, brown to gray silt, sand and gravel with some NAPL				
-13			13						
-14			13						
-15	16-17.8	48	10	17.2-17.8	CLAY AND SILT: Moist, dark brown to gray clay and interbedded silt				
-16			0.0						
-17									

# NO-DP14

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 6/16/2005

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 1002.19 ft. above MSL

WELL ELEVATION: NA

OUTER CASING ELEVATION: NA

DEPTH TO WATER: NA

BOREHOLE DEPTH: 24 ft. below grade

WEATHER: Cool, cloudy, rainy

GEOLOGIST: Amanda Bissell

DEPTH (ft.)	SAMPLE INTERVAL (ft.)	% RECOVERY	PID (ppm)	ANALYTICAL SAMPLE	SOIL DESCRIPTION and LITHOLOGIC SYMBOL	WELL CONSTRUCTION	REMARKS
0	0-4	80	0.0		ASPHALT		
-1			0.0		FILL: Dry to moist, brown, fine sand with gravel and coal-like material (CLM)		
-2			0.0				
-3			0.0		SAND AND GRAVEL: Dry to moist, brown, fine to coarse sand and gravel with trace clay and iron staining		
-4	4-8	60	0.0		SAND AND GRAVEL: As above with an odor and sheen from 7-8'		
-5			0.0				
-6			10.4				
-7			16.5				
-8	8-12	50	35		GRAVEL AND SAND: Wet, dark gray, gravel and coarse sand with strong odor and NAPL		
-9			51				
-10			29				
-11			11.1				
-12							

# NO-DP14

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 6/16/2005

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 1002.19 ft. above MSL

WELL ELEVATION: NA

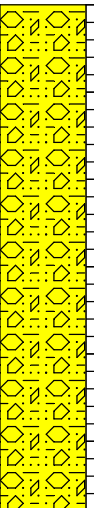
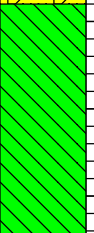
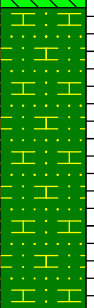
OUTER CASING ELEVATION: NA

DEPTH TO WATER: NA

BOREHOLE DEPTH: 24 ft. below grade

WEATHER: Cool, cloudy, rainy

GEOLOGIST: Amanda Bissell

DEPTH (ft.)	SAMPLE INTERVAL (ft.)	% RECOVERY	PID (ppm)	ANALYTICAL SAMPLE	SOIL DESCRIPTION and LITHOLOGIC SYMBOL	WELL CONSTRUCTION	REMARKS
-12	12-16	50	1.1		GRAVEL AND SAND: Wet, dark gray, gravel and coarse sand with strong odor and NAPL		
-13			1.6				
-14			3.2				
-15			19.7				
-16	16-20	50	36.5	18.7-20	CLAY: Moist, brown compact clay. NAPL on outside from layer above.		
-17			16.7				
-18			15.5				
-19			17.5				
-20	20-24	100	5.7	23-24	CLAY AND SILT: Moist, gray, interbedded clay and silt		
-21			5.4				
-22			1.7				
-23			1.1				
-24							

# NO-DP15/PZ04

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 10/29/2004

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 1001.94 ft. above MSL

WELL ELEVATION: 1001.55 ft. above MSL

OUTER CASING ELEVATION: N/A

DEPTH TO WATER: 7.85 below TOC (6/17/05)

BOREHOLE DEPTH: 20 ft. below grade

WEATHER: Not recorded

GEOLOGIST: Pete DeClercq

DEPTH (ft.)	SAMPLE INTERVAL (ft.)	% RECOVERY	PID (ppm)	ANALYTICAL SAMPLE	SOIL DESCRIPTION and LITHOLOGIC SYMBOL	WELL CONSTRUCTION	REMARKS
0							
-1	0-4	35	0.4		FILL: Dry, dark brown silt, sand and gravel with some coal-like material (CLM)		Flush mount curb box Sand and Concrete
-2			0.9		FILL: Dry, brown silt, sand and gravel		
-3			0.4				Bentonite Seal
-4			0.1		SILT: Dry, brown silt with clay		1-inch PVC riser
-5	4-8	75	0.8		SAND: Dry, gray, fine to medium sand		
-6			1.5				Water level (12/6/05)
-7			1.3	8.2-8.8	SAND AND GRAVEL: Dry, brown sand and gravel with some silt		
-8			2.1		SAND: Dry, brown, medium to coarse sand		Sand pack
-9	8-12	45			SAND: Wet, brown, medium to coarse sand		0.010-inch slotted screen
-10					SAND: Wet, brown, medium to coarse sand with a sheen and NAPL globules		
-11	12-16	0			NO RECOVERY		
-12							
-13							
-14							
-15							
-16							
-17	16-20	50					Well cap
-18							
-19			0.0	19.5-20	CLAY AND SILT: Wet, brown clay and interbedded silt		
-20							



# NO-DP16

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 10/26/2004

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 1003.73 ft. above MSL

WELL ELEVATION: NA

OUTER CASING ELEVATION: NA

DEPTH TO WATER: NA

BOREHOLE DEPTH: 20 ft. below grade

WEATHER: Not recorded

GEOLOGIST: Pete DeClercq

DEPTH (ft.)	SAMPLE INTERVAL (ft.)	% RECOVERY	PID (ppm)	ANALYTICAL SAMPLE	SOIL DESCRIPTION and LITHOLOGIC SYMBOL	WELL CONSTRUCTION	REMARKS
0	0-4	70	0.8		FILL: Dry gravel, sand, and silt with brick and other debris at 3.4'		
-1			1.3				
-2			1.8				
-3			2.3				
-4	4-8	50			SILT: Wet brown silt with some sand and iron staining		
-5							
-6			0.0		SILT: Moist, brown silt with iron staining		
-7			0.0				
-8	8-12	58	0.0		SILT: Dry, brown silt with iron staining		
-9			0.0				
-10			0.0		SILT, SAND AND GRAVEL: Dry, brown silt with sand and gravel		
-11			4.1				
-12	12-16	50	1.9		SILT, SAND AND GRAVEL: Wet, brown silt with sand, gravel and a slight MGP odor		
-13			0.0				
-14			0.0				
-15			0.0		SILT, SAND AND GRAVEL: Wet, brown silt, sand and gravel. Very slight sheen and a few small NAPL globules from 14.5 to 15.0'.		
-16	16-20	88	0.4				Driller felt clay at 17.5'
-17			0.0		SILT, SAND AND GRAVEL: Wet, brown silt, sand and gravel		
-18			0.0				
-19			0.0	19-20	CLAY AND SILT: Moist, dark brown to gray clay and silt		
-20							

# NO-DP17

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 10/26/2004

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 1004.34 ft. above MSL

WELL ELEVATION: NA

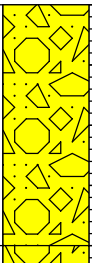
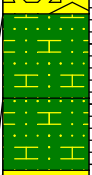
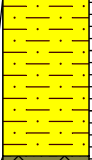
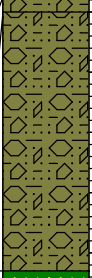
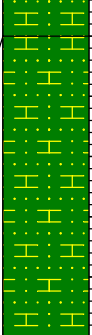
OUTER CASING ELEVATION: NA

DEPTH TO WATER: NA

BOREHOLE DEPTH: 20 ft. below grade

WEATHER: Not recorded

GEOLOGIST: Pete DeClercq

DEPTH (ft.)	SAMPLE INTERVAL (ft.)	% RECOVERY	PID (ppm)	ANALYTICAL SAMPLE	SOIL DESCRIPTION and LITHOLOGIC SYMBOL	WELL CONSTRUCTION	REMARKS
0	0-4	75	0.5		FILL: Dry, brown silt and gravel with slight staining and a very slight MGP odor from 3.5 to 4.0'		
-1			1				
-2			1.5				
-3			2				
-4	4-8	100	70		FILL: Dry, brown silt and gravel with some black residual tar-like material (TLM)		
-5			2.1				
-6			0.0				
-7			0.0				
-8	8-12	58	8.2	11.5-12	CLAY AND SILT: Dry, brown clay and silt		
-9			1.4				
-10			2.0				
-11			13				
-12	12-16	63		13.5-14.3	SILT AND GRAVEL: Moist silt with some black staining and MGP odor		
-13			0.9				
-14			1.3				
-15			0.3				
-16	16-20	75	0.0	18.9-20	CLAY AND SILT: Wet silt with gravel, clay and NAPL globules		
-17			0.0				
-18			0.0				
-19			0.0				
-20							

# NO-DP18/GW04-16

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 10/25/2004

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 1004.40 ft. above MSL

WELL ELEVATION: 1006.85 ft. above MSL

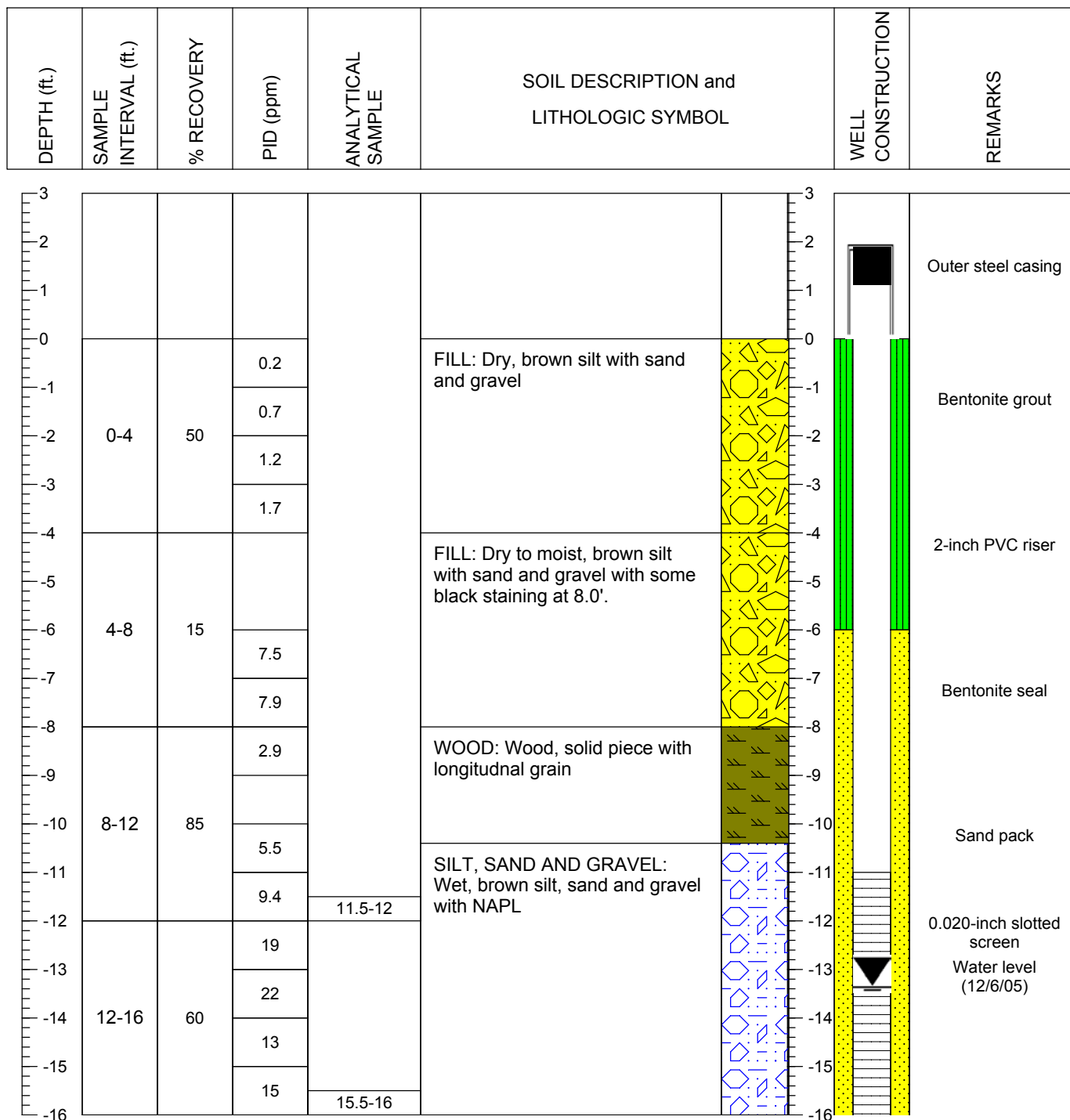
OUTER CASING ELEVATION: 1006.95 ft. above MSL

DEPTH TO WATER: 13.10 depth below TOC

BOREHOLE DEPTH: 28 ft. below grade

WEATHER: Not recorded

GEOLOGIST: Pete DeClercq



# NO-DP18/GW04-16

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 10/25/2004

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 1004.40 ft. above MSL

WELL ELEVATION: 1006.85 ft. above MSL

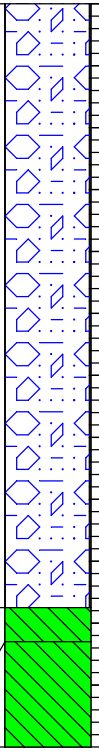
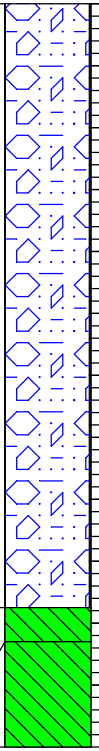
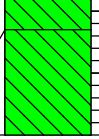
OUTER CASING ELEVATION: 1006.95 ft. above MSL

DEPTH TO WATER: 13.10 depth below TOC

BOREHOLE DEPTH: 28 ft. below grade

WEATHER: Not recorded

GEOLOGIST: Pete DeClercq

DEPTH (ft.)	SAMPLE INTERVAL (ft.)	% RECOVERY	PID (ppm)	ANALYTICAL SAMPLE	SOIL DESCRIPTION and LITHOLOGIC SYMBOL	WELL CONSTRUCTION	REMARKS
-16	16-20	25	20	19-20	SILT, SAND AND GRAVEL: Wet, brown gravel and sand with NAPL throughout		
-17			66				
-18			59				
-19	20-24	48					
-20			43				
-21							
-22	24-28	100	34	27.4-27.9	CLAY: Wet, brown clay  CLAY: Dry, dark brownish-gray clay and interbedded silt		Driller felt clay at 21'  Well cap
-23							
-24							
-25							
-26							
-27							
-28							

# NO-DP19/PZ11

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 4/26/2005

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 1004.13 ft. above MSL

WELL ELEVATION: 1003.86 ft. above MSL

OUTER CASING ELEVATION: NA

DEPTH TO WATER: 9.13 ft. below TOC

BOREHOLE DEPTH: 20 ft. below grade

WEATHER: Warm, sunny, breezy

GEOLOGIST: Lara Gray

DEPTH (ft.)	SAMPLE INTERVAL (ft.)	% RECOVERY	PID (ppm)	ANALYTICAL SAMPLE	SOIL DESCRIPTION and LITHOLOGIC SYMBOL	WELL CONSTRUCTION	REMARKS
0	0-4	60	0.0		ASPHALT		Flush mount curb box
-1			0.0		FILL: Dry, light brown silt, sand, gravel and concrete pieces		1-inch PVC riser
-2			0.0		FILL: Dry to moist, dark brown clay, sand, ash-like material, and coal-like material (CLM) with a few wood chips, black staining, and slight odor		Bentonite grout
-3			0.0				
-4	4-8	75	0.0				
-5			0.0	SAND AND GRAVEL: Dry to moist, orangey-brown, fine sand with some small gravel and iron staining			
-6			0.0				
-7			0.0				
-8	8-12	60	0.0		GRAVEL AND SAND: Moist to wet, orangey-brown, fine to medium sand with fine to large gravel. Unit is poorly sorted and some iron staining is present.		Water level (12/6/05)
-9			0.0				
-10			0.0				
-11			0.0				
-12	12-16	50	0.0	14-15	GRAVEL: Wet, fine to large, poorly sorted, rounded gravel		Sand pack
-13			0.0				
-14			0.0				
-15			0.0				
-16	16-20	70	0.0	18-19	CLAY AND SAND: Moist, gray clay with fine sand		0.010-inch slotted screen
-17			0.0				
-18			0.0				
-19			0.0				
-20							Well cap

# NO-DP20

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 10/29/2004

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 1004.67 ft. above MSL

WELL ELEVATION: NA

OUTER CASING ELEVATION: NA

DEPTH TO WATER: NA

BOREHOLE DEPTH: 24 ft. below grade

WEATHER: Not recorded

GEOLOGIST: Pete DeClercq

DEPTH (ft.)	SAMPLE INTERVAL (ft.)	% RECOVERY	PID (ppm)	ANALYTICAL SAMPLE	SOIL DESCRIPTION and LITHOLOGIC SYMBOL	WELL CONSTRUCTION	REMARKS
0			0.6		ASPHALT		
-1			1.1		FILL: Dry, brown sand and gravel with some silt		
-2	0-4	78	1.6				
-3			2.1				
-4			2.6				
-5							
-6	4-8	53	0.0				
-7			0.0				
-8					SILT: Moist, brown silt with trace clay and some iron staining		
-9					GRAVEL AND SAND: Moist, brown gravel and sand with some silt		
-10	8-12	65	0.0				
-11			0.0				
-12							

# NO-DP20

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 10/29/2004

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 1004.67 ft. above MSL

WELL ELEVATION: NA

OUTER CASING ELEVATION: NA

DEPTH TO WATER: NA

BOREHOLE DEPTH: 24 ft. below grade

WEATHER: Not recorded

GEOLOGIST: Pete DeClercq

DEPTH (ft.)	SAMPLE INTERVAL (ft.)	% RECOVERY	PID (ppm)	ANALYTICAL SAMPLE	SOIL DESCRIPTION and LITHOLOGIC SYMBOL	WELL CONSTRUCTION	REMARKS
-12	12-16	5			NO RECOVERY: No recovery due to boring hole caving in		
-13							
-14				NAPL Zone			
-15	16-20	40	0.0		NO RECOVERY: No recovery, boring hole caving in. NAPL present on bottom of sample sleeve.		Driller felt clay at 15' below grade
-16							
-17							
-18	20-24	12					
-19							
-20			25				
-21							
-22							
-23							
-24							

# NO-DP21A

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 10/29/2004

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 1004.13 ft. above MSL

WELL ELEVATION: NA

OUTER CASING ELEVATION: NA

DEPTH TO WATER: NA

BOREHOLE DEPTH: 2.1 ft. below grade

WEATHER: Not recorded

GEOLOGIST: Pete DeClercq

DEPTH (ft.)	SAMPLE INTERVAL (ft.)	% RECOVERY	PID (ppm)	ANALYTICAL SAMPLE	SOIL DESCRIPTION and LITHOLOGIC SYMBOL	WELL CONSTRUCTION	REMARKS
0					ASPHALT		
-1	0-2.1				FILL: Dry, brown sand and gravel with some silt. Refusal at 2.1 ft. Moved ~3' west ( see DP21B)		
-2							



# NO-DP21B

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 10/29/2004

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 1004.12 ft. above MSL

WELL ELEVATION: NA

OUTER CASING ELEVATION: NA

DEPTH TO WATER: NA

BOREHOLE DEPTH: 7.4 ft. below grade

WEATHER: Not recorded

GEOLOGIST: Pete DeClercq

DEPTH (ft.)	SAMPLE INTERVAL (ft.)	% RECOVERY	PID (ppm)	ANALYTICAL SAMPLE	SOIL DESCRIPTION and LITHOLOGIC SYMBOL	WELL CONSTRUCTION	REMARKS
0					ASPHALT		
-1			1.2		FILL: Dry, brown sand and gravel with some silt		
-2	0-4	80	1.7				
-3			2.2				
-4			2.7		FILL: Dry, brown sand and gravel with some coal like material (CLM) and brick pieces		
-5					NO RECOVERY: Refusal at 7.4'		
-6	4-7.4	0					
-7							

# NO-DP22

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 4/25/2005

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 1004.36 ft. above MSL

WELL ELEVATION: NA

OUTER CASING ELEVATION: NA

DEPTH TO WATER: NA

BOREHOLE DEPTH: 24 ft. below grade

WEATHER: Cool with flurries

GEOLOGIST: Lara Gray

DEPTH (ft.)	SAMPLE INTERVAL (ft.)	% RECOVERY	PID (ppm)	ANALYTICAL SAMPLE	SOIL DESCRIPTION and LITHOLOGIC SYMBOL	WELL CONSTRUCTION	REMARKS
0	0-4	100	0.0		ASPHALT		
-1			0.1		FILL: Dry, light brown silt, sand, gravel and concrete pieces		
-2			0.2				
-3			0.5				
-4	4-8	75	0.1		FILL: Moist, medium brown silt and fine sand with small to medium gravel and a few coal-like flecks. Slight black staining present.		
-5			0.2				
-6			0.2				
-7			0.5				
-8	8-12	75	0.4		SAND AND SILT: Moist to wet, medium brown, fine sand and silt with some gravel. Sheen and staining present throughout. NAPL globules present from 11.8-12.0'.		
-9			20				
-10			50				
-11			100				
-12			25	11.5-12			
-13							

# NO-DP22

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 4/25/2005

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 1004.36 ft. above MSL

WELL ELEVATION: NA

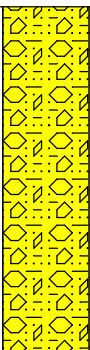
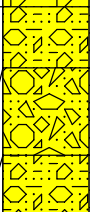
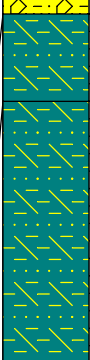
OUTER CASING ELEVATION: NA

DEPTH TO WATER: NA

BOREHOLE DEPTH: 24 ft. below grade

WEATHER: Cool with flurries

GEOLOGIST: Lara Gray

DEPTH (ft.)	SAMPLE INTERVAL (ft.)	% RECOVERY	PID (ppm)	ANALYTICAL SAMPLE	SOIL DESCRIPTION and LITHOLOGIC SYMBOL	WELL CONSTRUCTION	REMARKS
-14	12-16	60	75	14.5-15.5	GRAVEL AND SAND: Wet, brown, fine to medium sand and gravel. NAPL globules, sheen, and moderate odor present throughout.		
-15			26				
-16			46				
-17	16-20	70	35		GRAVEL AND SAND: As above with slight sheen and NAPL globules		
-18			25				
-19			36				
-20	1.5	GRAVEL: Wet, brown, small to medium gravel					
-21	1.5	GRAVEL AND SAND: Wet, brown, medium to coarse sand and gravel with sheen and slight NAPL globules present					
-22	20-24	100	0.5		CLAY AND SAND: Moist, reddish-brown, compact clay with fine sand		
-23			0.3		CLAY AND SAND: Moist to dry, gray clay with fine sand		
-24			0.1				

# NO-DP23/PZ06

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 10/28/2004

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 1002.13 ft. above MSL

WELL ELEVATION: 1001.82 ft. above MSL

OUTER CASING ELEVATION: NA

DEPTH TO WATER: 8.27 ft. below TOC

BOREHOLE DEPTH: 24 ft. below grade

WEATHER: Not recorded

GEOLOGIST: Pete DeClercq

DEPTH (ft.)	SAMPLE INTERVAL (ft.)	% RECOVERY	PID (ppm)	ANALYTICAL SAMPLE	SOIL DESCRIPTION and LITHOLOGIC SYMBOL	WELL CONSTRUCTION	REMARKS
0							Flush mount curb box Sand and concrete
-1			1.2				
-2	0-4	57	1.7				
-3							Bentonite seal
-4			1.6				
-5			1.4				1-inch PVC riser
-6	4-8	63	1.3				
-7			1.2				
-8							Water level (12/6/05)
-9			3.4				
-10	8-12	50	1.6				Sand pack
-11			1.6				
-12					SILT AND GRAVEL: Wet, brown silt and gravel with sand		
-13					SAND: Wet, brown sand with trace silt		
-14	12-16	25					0.010-inch slotted screen
-15							

# NO-DP23/PZ06

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 10/28/2004

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 1002.13 ft. above MSL

WELL ELEVATION: 1001.82 ft. above MSL

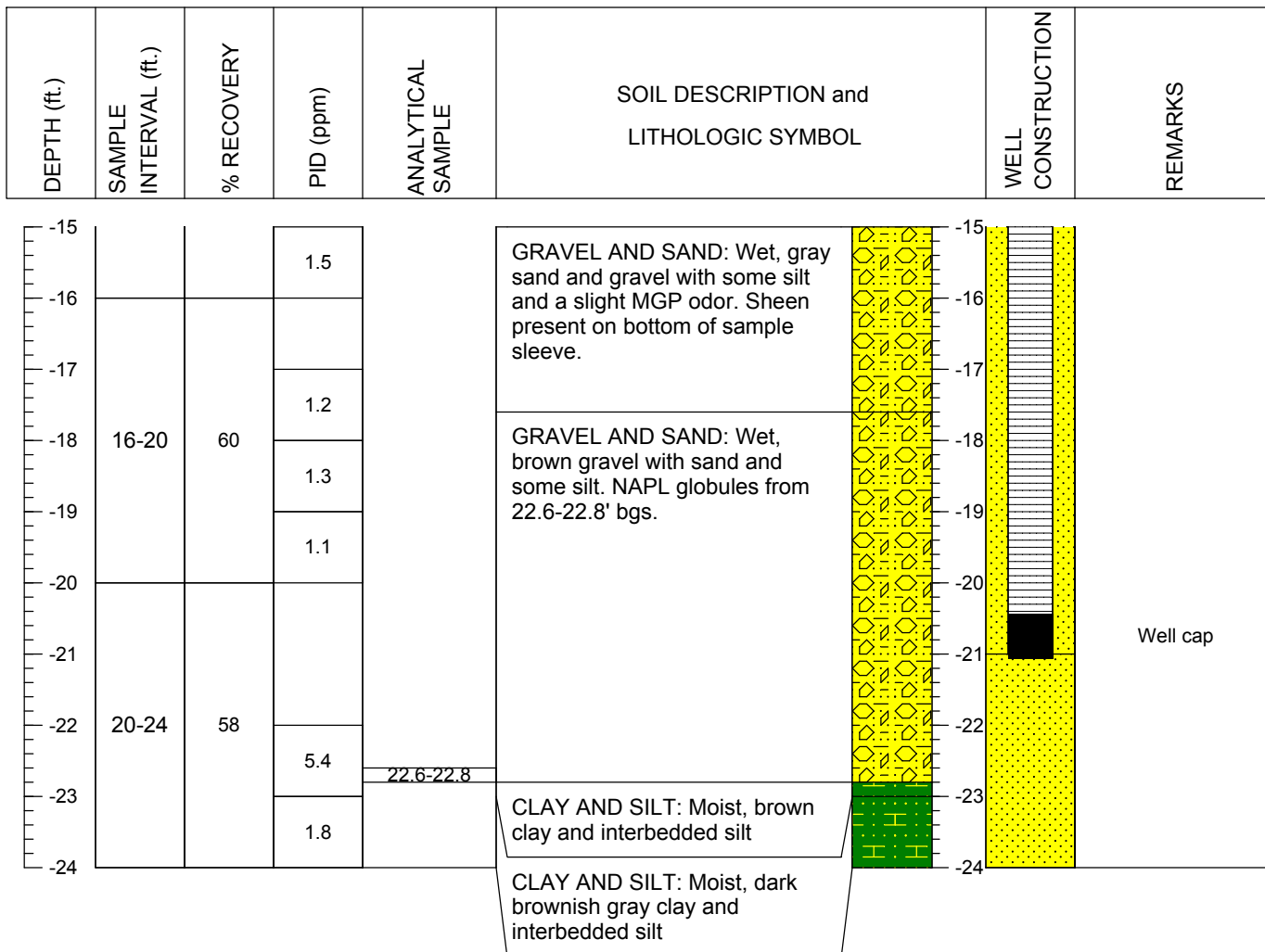
OUTER CASING ELEVATION: NA

DEPTH TO WATER: 8.27 ft. below TOC

BOREHOLE DEPTH: 24 ft. below grade

WEATHER: Not recorded

GEOLOGIST: Pete DeClercq



# NO-DP24/PZ05

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 10/28/2004

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 1003.24 ft. above MSL

WELL ELEVATION: 1002.86 ft. above MSL

OUTER CASING ELEVATION: NA

DEPTH TO WATER: 9.21 ft. below TOC

BOREHOLE DEPTH: 24 ft. below grade

WEATHER: Not recorded

GEOLOGIST: Pete DeClercq

DEPTH (ft.)	SAMPLE INTERVAL (ft.)	% RECOVERY	PID (ppm)	ANALYTICAL SAMPLE	SOIL DESCRIPTION and LITHOLOGIC SYMBOL	WELL CONSTRUCTION	REMARKS
0							
-1							
-2	0-4	68	0.0		SILT, SAND AND GRAVEL: Moist, brown silt with sand, gravel and a little coal-like material (CLM) from 3.1 to 3.3' bgs		Flush mount curb box Sand and concrete
-3			0.0				Bentonite seal
-4							
-5							
-6	4-8	58	0.9		SILT AND GRAVEL: Moist, brown silt and gravel with sand		1-inch PVC riser
-7			0.9				
-8			0.8		SAND AND SILT: Moist, brown silt and sand with gravel		
-9			0.9				
-10	8-12	55	0.9		SILT AND GRAVEL: Moist, brown silt and gravel with sand		Water level (12/6/05)
-11			0.7				
-12			0.8		SILT AND GRAVEL: Wet, brown silt and gravel with sand		Sand pack

# NO-DP24/PZ05

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 10/28/2004

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 1003.24 ft. above MSL

WELL ELEVATION: 1002.86 ft. above MSL

OUTER CASING ELEVATION: NA

DEPTH TO WATER: 9.21 ft. below TOC

BOREHOLE DEPTH: 24 ft. below grade

WEATHER: Not recorded

GEOLOGIST: Pete DeClercq

DEPTH (ft.)	SAMPLE INTERVAL (ft.)	% RECOVERY	PID (ppm)	ANALYTICAL SAMPLE	SOIL DESCRIPTION and LITHOLOGIC SYMBOL	WELL CONSTRUCTION	REMARKS
-12	12-16	0			NO RECOVERY		0.010-inch slotted screen
-13							
-14							
-15							
-16	16-20	0			NO RECOVERY: Core filled with slough from above		
-17							
-18							Driller felt clay at 18.5'
-19							
-20	20-24	0			NO RECOVERY: Core filled with slough from above and NAPL present on outside of sample sleeve		
-21							Well cap
-22							
-23							
-24							

# NO-DP25/PZ10

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 4/29/2005

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 1000.75 ft. above MSL

WELL ELEVATION: 1000.51 ft. above MSL

OUTER CASING ELEVATION: NA

DEPTH TO WATER: 6.30 ft. below TOC

BOREHOLE DEPTH: 20 ft. below grade

WEATHER: Cool, sunny, slight breeze

GEOLOGIST: Lara Gray

DEPTH (ft.)	SAMPLE INTERVAL (ft.)	% RECOVERY	PID (ppm)	ANALYTICAL SAMPLE	SOIL DESCRIPTION and LITHOLOGIC SYMBOL	WELL CONSTRUCTION	REMARKS	
0	0-4	100	0.0		TOPSOIL: Grass and dark brown silty topsoil		Flush mount curb box	
-1			0.0		FILL: Dry, dark brown silt with a little gravel and coal-like material (CLM)			
-2			0.0					
-3			0.0					
-4	4-8	75	0.0		SAND AND SILT: Dry, light orangy-brown silt and fine sand with a little gravel and iron staining		1-inch PVC riser	
-5			0.0		GRAVEL AND SAND: Dry to wet, brown, loosely packed silt, sand and gravel		Bentonite grout	
-6			0.0				Water level (12/6/05)	
-7			0.0					
-8	8-12	50	12	10-12	GRAVEL AND SAND: Wet, gray-stained sand and gravel with a sheen and fuel-like odor		Sand Pack	
-9			10		GRAVEL AND SAND: Wet, brown, coarse sand grading to rounded and poorly sorted gravel and sand with a very slight fuel-like odor			
-10			15				0.010-inch slotted screen	
-11			6.0					
-12	12-16	40	15		GRAVEL AND SAND: As above			
-13								
-14								
-15			6.0					
-16	16-20	75	2.0		CLAY AND SAND: Moist, orangy-brown grading to gray clay with fine sand			
-17			0.0					
-18			0.0					
-19			0.0				Well cap	
-20				19-20				



# NO-DP26/PZ09

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 4/28/2005

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 1004.79 ft. above MSL

WELL ELEVATION: 1004.49 ft. above MSL

OUTER CASING ELEVATION: NA

DEPTH TO WATER: 6.50 ft. below TOC

BOREHOLE DEPTH: 24 ft. below grade

WEATHER: Cool, cloudy, windy

GEOLOGIST: Lara Gray

DEPTH (ft.)	SAMPLE INTERVAL (ft.)	% RECOVERY	PID (ppm)	ANALYTICAL SAMPLE	SOIL DESCRIPTION and LITHOLOGIC SYMBOL	WELL CONSTRUCTION	REMARKS
0			0.0		TOPSOIL: Grass and dry, dark brown silty topsoil		Flush mount curb box
-1			0.0		SAND AND SILT: Dry, medium brown silt and fine sand with a little gravel		
-2	0-4	100	0.0				1-inch PVC riser
-3			0.0		SAND: Dry to moist, medium brown, fine to medium sand with some iron staining		
-4			0.0				Bentonite grout
-5			0.0				
-6	4-8	75	0.0		SAND AND SILT: Dry to moist, brown silt and sand with some gravel		Water level (12/6/05)
-7			0.0		GRAVEL AND SAND: Wet, brown, loosely packed sand and gravel		
-8			0.0				
-9			0.0				
-10	8-12	60	0.0	10-11			Sand pack
-11			0.0				
-12			0.0				

# NO-DP26/PZ09

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 4/28/2005

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 1004.79 ft. above MSL

WELL ELEVATION: 1004.49 ft. above MSL

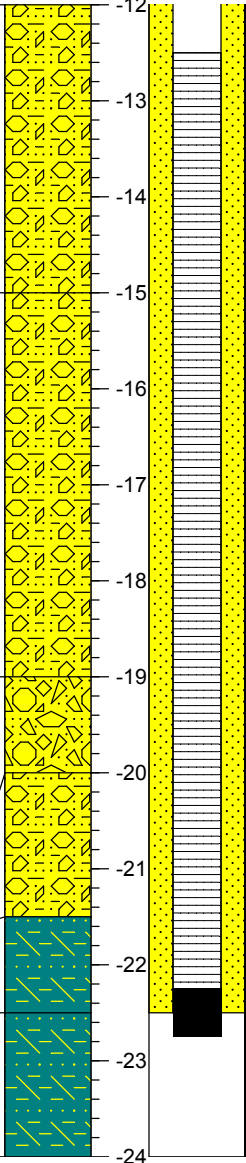
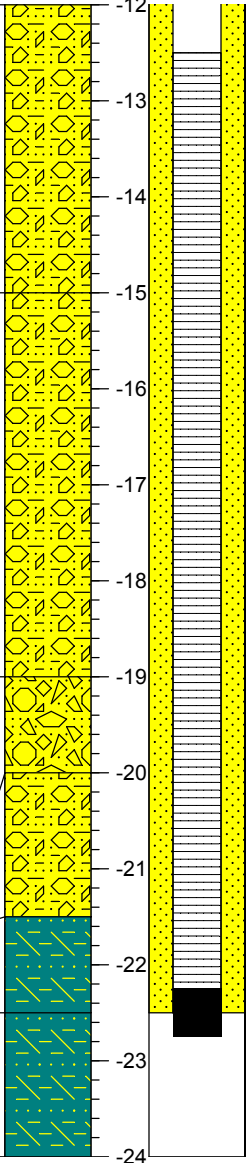
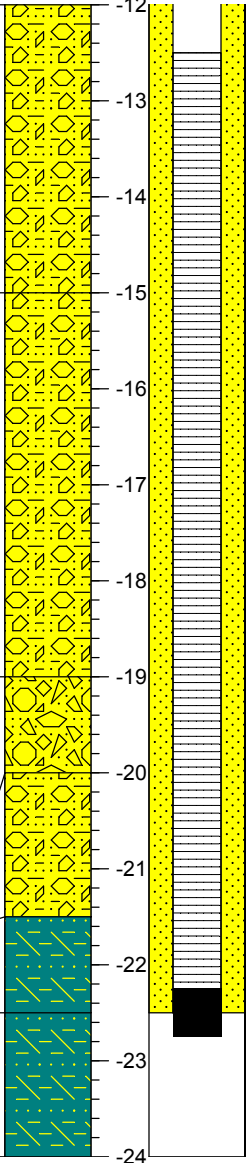
OUTER CASING ELEVATION: NA

DEPTH TO WATER: 6.50 ft. below TOC

BOREHOLE DEPTH: 24 ft. below grade

WEATHER: Cool, cloudy, windy

GEOLOGIST: Lara Gray

DEPTH (ft.)	SAMPLE INTERVAL (ft.)	% RECOVERY	PID (ppm)	ANALYTICAL SAMPLE	SOIL DESCRIPTION and LITHOLOGIC SYMBOL	WELL CONSTRUCTION	REMARKS
-12	12-16	60	0.0		GRAVEL AND SAND: Wet, brown, loosely packed sand and gravel		0.010-inch slotted screen
-13			0.0				
-14			0.0				
-15			0.0		GRAVEL AND SAND: As above		
-16	16-20	50	0.0				
-17			0.0				
-18			0.0				
-19			1.5		GRAVEL: Wet, small to medium, rounded gravel with sheen. NAPL globules on sample sleeve.		
-20	20-24	100	150	20.0-21.5	GRAVEL AND SAND: Wet, loosely packed sand and gravel with substantial NAPL present		Well cap
-21			200				
-22			40	23-24	CLAY AND SAND: Moist, orangy-brown clay and fine sand		
-23			40		CLAY AND SAND: Moist, gray clay with fine sand. NAPL smearing on outside from gravel layer above.		
-24							

# NO-DP27/PZ12

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 4/26/2005

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 1003.82 ft. above MSL

WELL ELEVATION: 1003.45 ft. above MSL

OUTER CASING ELEVATION: NA

DEPTH TO WATER: 8.67 ft. below TOC

BOREHOLE DEPTH: 32 ft. below grade

WEATHER: Warm, sunny, breezy

GEOLOGIST: Lara Gray

DEPTH (ft.)	SAMPLE INTERVAL (ft.)	% RECOVERY	PID (ppm)	ANALYTICAL SAMPLE	SOIL DESCRIPTION and LITHOLOGIC SYMBOL	WELL CONSTRUCTION	REMARKS
0	0-4	50	0.0		ASPHALT		Flush mount curb box
-1			0.0		FILL: Dry, light brown silt, sand, gravel and concrete pieces		
-2			0.0				
-3			0.0				Bentonite grout
-4	4-8	20	0.0				
-5			0.0				
-6			0.0				1-inch PVC riser
-7			0.0				
-8	8-12	75	0.0		SILT: Moist, light brown silt with a little iron staining		Water level (12/6/05)
-9			0.0		SAND AND GRAVEL: Moist to wet, brown, fine sand with small to medium gravel and some iron staining		
-10			0.0				
-11			0.0				
-12	12-16	80	0.0		GRAVEL AND SAND: Moist to wet, brown, fine sand with fine to medium gravel and some iron staining		Sand pack
-13			0.0				
-14			0.0				0.010-inch slotted screen
-15			0.0				
-16							

# NO-DP27/PZ12

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 4/26/2005

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 1003.82 ft. above MSL

WELL ELEVATION: 1003.45 ft. above MSL





OUTER CASING ELEVATION: NA

DEPTH TO WATER: 8.67 ft. below TOC

BOREHOLE DEPTH: 32 ft. below grade

WEATHER: Warm, sunny, breezy

GEOLOGIST: Lara Gray

DEPTH (ft.)	SAMPLE INTERVAL (ft.)	% RECOVERY	PID (ppm)	ANALYTICAL SAMPLE	SOIL DESCRIPTION and LITHOLOGIC SYMBOL	WELL CONSTRUCTION	REMARKS
-16	16-20	60	0.0	17.5-18 18-183.5	GRAVEL AND SAND: As above		
-17			0.0		SAND: Wet, brown, coarse sand with a slight sheen. NAPL present on tip of sampling sleeve.		
-18			0.0				
-19			0.0		GRAVEL: Wet, medium to coarse gravel		
-20	20-24	60	0.0		GRAVEL: Wet, small to coarse, angular gravel		
-21			0.0				
-22			0.0				
-23			0.0				
-24	24-28	0			NO RECOVERY		Driller felt clay at 23' bgs  Well cap
-25							
-26							
-27							
-28	28-32	100	0.0	31-32	CLAY AND SAND: Moist, gray clay with some fine sand		
-29			0.0				
-30			0.0				
-31			0.0				
-32							

# NO-DP28

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 4/27/2005

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 1003.73 ft. above MSL

WELL ELEVATION: NA

OUTER CASING ELEVATION: NA

DEPTH TO WATER: NA

BOREHOLE DEPTH: 28 ft. below grade

WEATHER: Cool, cloudy, light rain

GEOLOGIST: Lara Gray

DEPTH (ft.)	SAMPLE INTERVAL (ft.)	% RECOVERY	PID (ppm)	ANALYTICAL SAMPLE	SOIL DESCRIPTION and LITHOLOGIC SYMBOL	WELL CONSTRUCTION	REMARKS
0	0-4	90	0.0		ASPHALT		
-1			0.0		FILL: Dry, light brown silt, sand, gravel and concrete pieces		
-2			0.0				
-3			0.0				
-4	4-8	90	0.0		FILL: Dry, black ash-like material with some coal-like material (CLM) and broken rock pieces		
-5			0.0		SILT: Dry, dark reddish-brown silt with a little gravel		
-6			0.0				
-7			0.0		SAND AND SILT: Dry to moist, light brown, fine sand and silt with some iron staining		
-8	8-12	50	0.	7-8			
-9			0.0	GRAVEL AND SAND: Moist to wet, brown, poorly sorted sand with small to large gravel and some iron staining			
-10			0.0				
-11			0.0				
-12	12-16	50	0.0	14-15			
-13			0.0				
-14			0.0				
-15			0.0				
-16							

# NO-DP28

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 4/27/2005

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 1003.73 ft. above MSL

WELL ELEVATION: NA

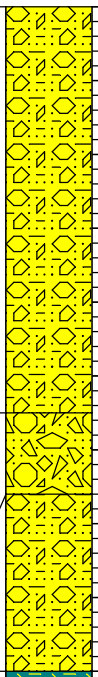
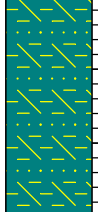
OUTER CASING ELEVATION: NA

DEPTH TO WATER: NA

BOREHOLE DEPTH: 28 ft. below grade

WEATHER: Cool, cloudy, light rain

GEOLOGIST: Lara Gray

DEPTH (ft.)	SAMPLE INTERVAL (ft.)	% RECOVERY	PID (ppm)	ANALYTICAL SAMPLE	SOIL DESCRIPTION and LITHOLOGIC SYMBOL	WELL CONSTRUCTION	REMARKS
-16	16-20	2	0.0		GRAVEL AND SAND: Wet, brown, very loosely packed sand and gravel. Poor recovery.		
-17			0.0				
-18	20-24	35	0.0		GRAVEL: Wet, very fine to medium, well sorted, rounded gravel		
-19			0.1				
-20			0.0				
-21			0.0				
-22	24-28	90	0.0		GRAVEL AND SAND: Wet, brown, fine sand with fine to large angular gravel		
-23			0.0				
-24			0.0				
-25			0.0				
-26			0.0				
-27			0.0		CLAY AND SAND: Moist, gray clay with fine sand		
-28							

# NO-DP29

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 4/27/2005

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 1004.96 ft. above MSL

WELL ELEVATION: NA

OUTER CASING ELEVATION: NA

DEPTH TO WATER: NA

BOREHOLE DEPTH: 24 ft. below grade

WEATHER: Cool, cloudy, light rain

GEOLOGIST: Lara Gray

DEPTH (ft.)	SAMPLE INTERVAL (ft.)	% RECOVERY	PID (ppm)	ANALYTICAL SAMPLE	SOIL DESCRIPTION and LITHOLOGIC SYMBOL	WELL CONSTRUCTION	REMARKS
0	0-4	80	0.0		ASPHALT		
-1			0.0		FILL: Dry, medium brown sand and gravel		
-2			0.0				
-3			0.0		FILL: Broken concrete pieces		
-4	4-8	50	0.0		FILL: Dry, black sand, ash-like material, coal-like material (CLM) and brick pieces		
-5			0.0				
-6			0.0				
-7			0.0				
-8	8-12	80	0.0		SAND AND SILT: Dry to moist, brown, fine sand and silt with some iron staining		
-9			0.0		SAND AND SILT: As above with some gravel		
-10			0.0				
-11			0.0				
-12			0.0		SAND AND SILT: As above		
-13			0.0				

# NO-DP29

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 4/27/2005

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 1004.96 ft. above MSL

WELL ELEVATION: NA

OUTER CASING ELEVATION: NA

DEPTH TO WATER: NA

BOREHOLE DEPTH: 24 ft. below grade

WEATHER: Cool, cloudy, light rain

GEOLOGIST: Lara Gray

DEPTH (ft.)	SAMPLE INTERVAL (ft.)	% RECOVERY	PID (ppm)	ANALYTICAL SAMPLE	SOIL DESCRIPTION and LITHOLOGIC SYMBOL	WELL CONSTRUCTION	REMARKS
-14	12-16	50	0.0		GRAVEL AND SAND: Wet, brown, loosely packed, poorly sorted, medium to coarse sand and angular gravel		
-15			0.0				
-16			0.0				
-17			0.0				
-18	16-20	40	0.0		SAND AND SILT: Wet, brown, sand and silt with small to medium gravel and some iron staining		
-19			0.0				
-20			0.0		SAND AND SILT: As above with a very slight odor		
-21			6.2				
-22	20-24	60	2.6	22.5-23			
-23			0.0	23-24	CLAY AND SAND: Moist, reddish-brown to gray clay with fine sand		
-24							



# NO-DP30

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 4/29/2005

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 1001.87 ft. above MSL

WELL ELEVATION: NA

OUTER CASING ELEVATION: NA

DEPTH TO WATER: NA

BOREHOLE DEPTH: 24 ft. below grade

WEATHER: Warm, sunny, slight breeze

GEOLOGIST: Lara Gray

DEPTH (ft.)	SAMPLE INTERVAL (ft.)	% RECOVERY	PID (ppm)	ANALYTICAL SAMPLE	SOIL DESCRIPTION and LITHOLOGIC SYMBOL	WELL CONSTRUCTION	REMARKS
0	0-4	50	0.0		TOPSOIL: Moist, dark brown, silty topsoil with some organic material		
-1			0.0				
-2			0.0				
-3			0.0		SAND AND SILT: Dry, medium to dark brown sand and silt with some gravel and iron staining		
-4	4-8	75	0.0				
-5			0.0				
-6			0.0		GRAVEL AND SAND: Dry to moist, brown sand with some angular gravel and iron staining		
-7			0.0				
-8	8-12	75	0.0		CLAY AND SILT: Moist, orangy-brown silt and clay		
-9			0.0				
-10			0.0		CLAY AND SILT: Dry to moist, gray, compact clay and silt		
-11			0.0				
-12	12-16	80	0.0				
-13			0.0		CLAY AND SAND: Moist, gray clay with fine sand		
-14			0.0				
-15			0.0				
-16	16-20	100	0.0				
-17			0.0				
-18			0.0				
-19			0.0				
-20	20-24	100	0.0		CLAY AND SILT: Moist, gray clay with fine silt		
-21			0.0				
-22			0.0				
-23			0.0				
-24			0.0	23-24			

# NO-DP31

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 4/29/2005

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 1001.30 ft. above MSL

WELL ELEVATION: NA

OUTER CASING ELEVATION: NA

DEPTH TO WATER: NA

BOREHOLE DEPTH: 24 ft. below grade

WEATHER: Warm, sunny, slight breeze

GEOLOGIST: Lara Gray

DEPTH (ft.)	SAMPLE INTERVAL (ft.)	% RECOVERY	PID (ppm)	ANALYTICAL SAMPLE	SOIL DESCRIPTION and LITHOLOGIC SYMBOL	WELL CONSTRUCTION	REMARKS
0	0-4	90	0.0		TOPSOIL: Moist, black, sandy topsoil		
-1			0.0				
-2			0.0		SAND AND SILT: Dry, dark brown silt and fine sand		
-3			0.0				
-4	4-8	60	0.0		SAND AND SILT: Dry, orangey-brown silt and fine sand with a little gravel		
-5			0.0				
-6			0.0		SAND: Moist, medium sand		
-7			0.0				
-8	8-12	100	0.0	6.5-7.5	SAND AND GRAVEL: Moist to wet, brown sand and gravel with some silt		
-9			0.0				
-10			0.0		SILT: Moist, brown silt with clay		
-11			0.0		CLAY AND SILT: Moist, gray clay with silt		
-12	12-16	100	0.0		CLAY AND SILT: Moist, gray clay with silt		
-13			0.0				
-14			0.0				
-15			0.0				
-16	16-20	100	0.0				
-17			0.0				
-18			0.0				
-19			0.0				
-20	20-24	60	0.0	19-20			
-21			0.0				
-22			0.0				
-23			0.0				
-24							

# NO-DP32/PZ13

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 4/27/2005

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 1000.88 ft. above MSL

WELL ELEVATION: 1000.52 ft. above MSL

OUTER CASING ELEVATION: NA

DEPTH TO WATER: 6.40 ft. below TOC

BOREHOLE DEPTH: 16 ft. below grade

WEATHER: Cool, cloudy, light rain

GEOLOGIST: Lara Gray

DEPTH (ft.)	SAMPLE INTERVAL (ft.)	% RECOVERY	PID (ppm)	ANALYTICAL SAMPLE	SOIL DESCRIPTION and LITHOLOGIC SYMBOL	WELL CONSTRUCTION	REMARKS
0	0-4	100	0.0		TOPSOIL: Grass and silty topsoil		Flush mount curb box
-1			0.0		FILL: Dry, medium brown silt and fine sand with a little coal-like material (CLM) at 2.3'		Bentonite grout
-2			0.0				
-3	4-8	75	0.0		SILT: Dry, light brown silt and fine sand with some iron staining		1-inch PVC riser
-4			0.0		FINE SAND: Moist, brown, fine sand with some iron staining		Sand pack
-5			0.0				
-6	8-12	50	0.0		SAND: Moist, brown, fine sand with small gravel		Water level (12/6/05)
-7			0.0		GRAVEL AND SAND: Wet, brown loosely packed sand and gravel with a sheen		
-8			0.0				
-9	12-16	50	3.0	10-11	GRAVEL AND SAND: As above - no sheen		0.010-inch slotted screen
-10			3.0				
-11			3.0				
-12			0.0	13-16	CLAY AND SAND: Moist to wet, gray clay with fine sand		Well cap
-13			0.0				
-14			0.0				
-15			0.0				
-16							

# NO-DP33/PZ14

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 4/27/2005

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 1000.25 ft. above MSL

WELL ELEVATION: 999.96 ft. above MSL

OUTER CASING ELEVATION: NA

DEPTH TO WATER: 5.90 ft. below TOC

BOREHOLE DEPTH: 20 ft. below grade

WEATHER: Cool, cloudy, light rain

GEOLOGIST: Lara Gray

DEPTH (ft.)	SAMPLE INTERVAL (ft.)	% RECOVERY	PID (ppm)	ANALYTICAL SAMPLE	SOIL DESCRIPTION and LITHOLOGIC SYMBOL	WELL CONSTRUCTION	REMARKS
0	0-4	80	0.0		TOPSOIL: Grass and silty topsoil	0	Flush mount curb box
-1			0.0		FILL: Moist, medium brown silt	-1	Bentonite grout
-2			0.0			-2	
-3			0.0			-3	
-4	4-8	50	0.0		FILL: Moist, brown silt with coal-like material (CLM) and white ash-like material	-4	1-inch PVC riser
-5			0.0		SAND AND SILT: Dry to moist, light brown, fine sand and silt with some iron staining	-5	
-6			0.0			-6	
-7			0.0			-7	
-8	8-12	30	0.0		SAND AND GRAVEL: Moist to wet, fine to medium sand with fine to medium angular gravel	-8	Sand pack
-9			0.0			-9	
-10			0.0			-10	
-11			0.0			-11	
-12	12-16	50	0.0		GRAVEL AND SAND: Wet, brown, loosely packed, rounded, medium to coarse sand and gravel	-12	Water level (12/6/05)
-13			0.0			-13	
-14			0.0			-14	
-15			0.0			-15	
-16	16-20	100	0.0	15-15.8	CLAY AND SAND: Wet, brown clay with sand and gravel	-16	0.010-inch slotted screen
-17			0.0		CLAY AND SAND: Moist to wet, gray clay with fine sand	-17	
-18			0.0			-18	
-19			0.0			-19	
-20						-20	Well cap

# NO-DP34/PZ15

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 6/14/2005

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 1000.17 ft. above MSL

WELL ELEVATION: 999.81 ft. above MSL

OUTER CASING ELEVATION: NA

DEPTH TO WATER: 5.81 ft. below TOC

BOREHOLE DEPTH: 24 ft. below grade

WEATHER: Hot, humid, few showers

GEOLOGIST: Lara Gray

DEPTH (ft.)	SAMPLE INTERVAL (ft.)	% RECOVERY	PID (ppm)	ANALYTICAL SAMPLE	SOIL DESCRIPTION and LITHOLOGIC SYMBOL	WELL CONSTRUCTION	REMARKS
0	0-4	95	0.0		TOPSOIL: Moist, dark brown silt and sand with root material	0	Flush mount curb box
-1			0.0		SAND AND SILT: Moist, brown, fine sand and silt with some gravel and root material	-1	Bentonite grout
-2			0.0			-2	
-3			0.0			-3	
-4	4-8	70	0.0		SAND AND SILT: Dry, light brown, fine sand, silt, and gravel with iron staining	-4	1-inch PVC riser
-5			0.0		-5	Water level (12/6/05)	
-6			0.0		-6		
-7			8-12		50	0.0	
-8	0.0	-8					
-9	0.0	-9					
-10	0.0	-10					
-11	12-16	30	0.0	15-16	GRAVEL: Wet, small to medium, rounded, well sorted gravel	-11	0.010-inch slotted screen
-12			0.6		-12		
-13			1.6		-13		
-14			1.0		-14		
-15	16-20	50	1.0	19-19.3	GRAVEL: Wet, small to medium, rounded, well sorted gravel with a very slight odor from 19-19.3'	-15	Well cap
-16			2.0		-16		
-17			0.0		-17		
-18			0.0		-18		
-19	20-24	100	0.0	22-23	CLAY AND SILT: Moist, brown silt and clay with iron staining	-19	
-20			0.0		-20		
-21			0.0		-21		
-22			0.0		-22		
-23			0.0		CLAY AND SAND: Moist, gray clay with fine sand	-23	
-24						-24	

# NO-DP35/PZ16

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 4/28/2005

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 1004.81 ft. above MSL

WELL ELEVATION: 1004.49 ft. above MSL

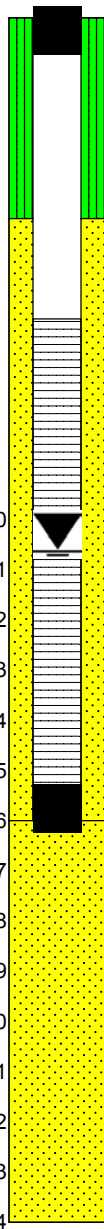
OUTER CASING ELEVATION: NA

DEPTH TO WATER: 10.30 ft. below TOC

BOREHOLE DEPTH: 24 ft. below grade

WEATHER: Cool, cloudy, showers

GEOLOGIST: Lara Gray

DEPTH (ft.)	SAMPLE INTERVAL (ft.)	% RECOVERY	PID (ppm)	ANALYTICAL SAMPLE	SOIL DESCRIPTION and LITHOLOGIC SYMBOL	WELL CONSTRUCTION	REMARKS
0	0-4	50	0.0		FILL: Dry to moist, dark brown silt, sand and gravel		Flush mount curb box
-1			0.0				
-2			0.0				1-inch PVC riser
-3			0.0				Bentonite grout
-4	4-8	100	0.0		SILT: Dry, medium brown silt with a little iron staining and root material		
-5			0.0				
-6			0.0				Sand pack
-7			0.0				
-8	8-12	100	0.0		SAND AND SILT: Dry to moist, light brown silt and fine sand with some angular gravel		
-9			0.0				
-10			0.0				Water level (12/6/05)
-11			0.0				
-12	12-16	100	0.0	12.0-12.5	GRAVEL AND SAND: Wet, brown, loosely packed sand and gravel  SAND AND SILT: Moist, brown, very fine sand and silt  CLAY: Moist, gray clay with fine sand		
-13			0.0				
-14			0.0				0.010-inch slotted screen
-15			0.0				
-16	16-20	100	0.0				Well cap
-17			0.0				
-18			0.0				
-19			0.0				
-20	20-24	100	0.0				
-21			0.0				
-22			0.0				
-23			0.0				
-24			0.0				

# NO-DP36/PZ17

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 4/28/2005

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 1004.04 ft. above MSL

WELL ELEVATION: 1003.68 ft. above MSL

OUTER CASING ELEVATION: NA

DEPTH TO WATER: 9.32 ft. below TOC

BOREHOLE DEPTH: 20 ft. below grade

WEATHER: Warm, sunny, windy

GEOLOGIST: Lara Gray

DEPTH (ft.)	SAMPLE INTERVAL (ft.)	% RECOVERY	PID (ppm)	ANALYTICAL SAMPLE	SOIL DESCRIPTION and LITHOLOGIC SYMBOL	WELL CONSTRUCTION	REMARKS
0							
-1	-4	75	0.0		TOPSOIL: Grass and medium brown silty topsoil		Flush mount curb box
-2			0.0		FILL: Dry, medium brown silt with some gravel and coal-like material (CLM)		Bentonite grout
-3			0.0				
-4			0.0		SILT: Dry, orangy-brown silt with a little rounded gravel		1-inch PVC riser
-5			0.0				
-6	-8	50	0.0				
-7			0.0				
-8			0.0				
-9			0.0	8.8-9.7			Water level (12/6/05)
-10	-12	100	0.0		SAND AND SILT: Dry, medium brown, compact silt and sand with some gravel		
-11			0.0		CLAY AND SAND: Moist, orangy-brown gray clay and fine sand		
-12			0.0				0.010-inch slotted screen
-13			0.0	13.0-13.9	CLAY AND SAND: Moist, gray clay and fine sand		
-14	-16	100	0.0		SAND: Wet, gray fine sand with a little clay		
-15			0.0		CLAY AND SAND: Moist, gray clay with very fine sand		Well cap
-16			0.0				
-17			0.0		NO RECOVERY		
-18	-20	0	0.0				
-19			0.0				
-20			0.0				

# NO-DP37

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 5/19/2005

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 1002.25 ft. above MSL

WELL ELEVATION: NA

OUTER CASING ELEVATION: NA

DEPTH TO WATER: NA

BOREHOLE DEPTH: 32 ft. below grade

WEATHER: Warm, partly sunny

GEOLOGIST: Lara Gray

DEPTH (ft.)	SAMPLE INTERVAL (ft.)	% RECOVERY	PID (ppm)	ANALYTICAL SAMPLE	SOIL DESCRIPTION and LITHOLOGIC SYMBOL	WELL CONSTRUCTION	REMARKS
0	0-4	5			NO RECOVERY: Very little recovery - only a small amount of grass and topsoil		
-1							
-2							
-3							
-4							
-5	4-8	90	0.0		FILL: Dry, brown, very fine sand with some small gravel and brick pieces		
-6			0.0				
-7			0.0				
-8			0.0				
-9	8-12	50	0.0		SAND AND GRAVEL: Dry to moist, tightly packed, fine to medium sand with angular gravel		
-10			0.0				
-11			0.0				
-12			0.0				
-13	12-16	60	0.0		GRAVEL: Wet, small to large gravel		
-14			0.0				
-15			0.0				
-16			0.0				
-17	16-20	50	0.0		SAND: Wet, medium to coarse sand		
-18			0.0				
-19			0.6				
-20			1.0				
-21	20-24	40	1.0		GRAVEL: Wet, small to large, rounded gravel with a slight odor in shoe		
-22			1.0				
-23			82		GRAVEL: As above with strong odor and sheen. NAPL blebs from 23.5-24		
-24			66				
-25	24-28	100	110		CLAY: Moist, brown to gray clay. NAPL on outside from layer above.		
-26			290	26.5-27.5			
-27			344				
-28			113				
-29	28-32	100	60		CLAY AND SAND: Moist, gray, interbedded clay and sand. NAPL on outside from layer above.		
-30			20				
-31			2.0	31.5-32			
-32							



# NO-DP38/PZ20

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 5/20/2005

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 1003.97 ft. above MSL

WELL ELEVATION: 1003.64 ft. above MSL

OUTER CASING ELEVATION: NA

DEPTH TO WATER: 9.65 ft. below TOC

BOREHOLE DEPTH: 28 ft. below grade

WEATHER: Warm, cloudy, light breeze

GEOLOGIST: Lara Gray

DEPTH (ft.)	SAMPLE INTERVAL (ft.)	% RECOVERY	PID (ppm)	ANALYTICAL SAMPLE	SOIL DESCRIPTION and LITHOLOGIC SYMBOL	WELL CONSTRUCTION	REMARKS
0	0-4	75	0.7		FILL: Dry, dark brown to black sand, gravel and coal-like material (CLM)		Flush mount curb box
-1			0.7				
-2			0.4				
-3	4-8	75	0.7		FILL: Dry, orangey-brown, fine sand and silt with angular clasts and concrete pieces		Bentonite grout
-4			0.2				
-5			0.5				
-6	8-12	50	1.0		SAND: Dry, brown, medium to coarse sand with a very slight odor at 6'		1-inch PVC riser
-7			0.7				
-8			0.2				
-9	12-16	40	0.2		SAND AND GRAVEL: Dry to moist, brown, fine to medium sand with gravel		Sand pack
-10			0.2				
-11			0.4				
-12	16-20	5	0.4		GRAVEL AND SAND: Wet, loosely packed, coarse sand and gravel		Water level (12/6/05)
-13			0.2				
-14			0.5				
-15	20-24	25	0.8		NO RECOVERY: Recovery in shoe only - wet gray clay and sand		0.010-inch slotted screen
-16			0.2				
-17			0.2				
-18	24-28	30	0.2		CLAY: Wet, gray clay		Well cap
-19			0.0				
-20			0.0				
-21	27-28		0.0				
-22			0.0				
-23			0.0				
-24							
-25							
-26							
-27							
-28							

# NO-DP39/PZ21

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 6/16/2005

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 1001.69 ft. above MSL

WELL ELEVATION: 1001.25 ft. above MSL

OUTER CASING ELEVATION: NA

DEPTH TO WATER: 7.23 ft. below TOC

BOREHOLE DEPTH: 26 ft. below grade

WEATHER: Hot, humid, sunny, slight breeze

GEOLOGIST: Lara Gray

DEPTH (ft.)	SAMPLE INTERVAL (ft.)	% RECOVERY	PID (ppm)	ANALYTICAL SAMPLE	SOIL DESCRIPTION and LITHOLOGIC SYMBOL	WELL CONSTRUCTION	REMARKS
0	0-4	40	0.0		FILL: Moist, black sand, gravel, and asphalt-like material (ALM)		Flush mount curb box
-1			0.0				
-2			0.0				
-3			0.0				
-4	4-8	75	1.0		SAND AND SILT: Dry to moist, dark brown silt and sand with a little gravel		Bentonite grout
-5			1.0				
-6			2.0				
-7			2.0				
-8	8-12	30	0.6		GRAVEL AND SAND: Moist to wet, brown, rounded gravel with fine to medium sand		Water level (12/6/05)
-9			0.8				
-10			0.0				
-11			0.0				
-12	12-16	75	2.0	13-13.5	GRAVEL: Wet, brown, rounded, small to medium gravel with a very slight odor		Sand pack
-13			1.0				
-14			3.0				
-15			0.0				
-16	16-20	100	0.0		CLAY AND SILT: Moist, reddish-brown clay and silt with a little coarse sand and gravel		0.010-inch slotted screen
-17			0.0				
-18			0.0				
-19			0.0				
-20	20-23	100	0.0		SILT: Moist, brown silt with a little clay and fine sand		Well cap
-21			0.0				
-22			0.0				
-23			0.0				
-24	23-26	100	0.0	24-25	CLAY AND SAND: Moist, gray clay with fine sand		
-25			0.0				
-26			0.0				

# NO-DP40

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 5/20/2005

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 1004.25 ft. above MSL

WELL ELEVATION: NA

OUTER CASING ELEVATION: NA

DEPTH TO WATER: NA

BOREHOLE DEPTH: 31.5 ft. below grade

WEATHER: Warm, partly sunny, light breeze

GEOLOGIST: Lara Gray

DEPTH (ft.)	SAMPLE INTERVAL (ft.)	% RECOVERY	PID (ppm)	ANALYTICAL SAMPLE	SOIL DESCRIPTION and LITHOLOGIC SYMBOL	WELL CONSTRUCTION	REMARKS
0					NO RECOVERY: Auger to 9' - see DP40A for lithology - concrete from 8.2-8.8'		
-1							
-2							
-3							
-4							
-5							
-6							
-7							
-8							
-9			17				
-10	9-11.5	40	3.0		FILL: Wet, black sand, gravel, coal-like material (CLM), and concrete pieces		
-11			0.5				
-12			0.5				
-13	11.5-15.5	50	0.5		SAND AND SILT: Moist, orangey-brown sand and silt with trace clay		
-14			0.0				
-15			0.4				
-16			0.0				
-17	15.5-19.5	35	0.0		SAND AND GRAVEL: Wet, orangey-brown, loosely packed, fine to coarse sand and gravel		
-18			0.0				
-19			0.0				
-20			138				
-21	19.5-23.5	50	63		GRAVEL AND SAND: Wet coarse sand and gravel with sheen and NAPL		
-22			135	21.5-23.5			
-23			142				
-24			110				
-25	23.5-27.5	80	11		CLAY AND SILT: Moist, gray clay with NAPL on outside from layer above		
-26			22	26.5-27.5			
-27			70				
-28			80				
-29	27.5-31.5	80	70				
-30			10				
-31							

# NO-DP40A

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 5/19/2005

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 1004.25 ft. above MSL

WELL ELEVATION: NA

OUTER CASING ELEVATION: NA

DEPTH TO WATER: NA

BOREHOLE DEPTH: 8.2 ft. below grade

WEATHER: Hot, sunny, slight breeze

GEOLOGIST: Lara Gray

DEPTH (ft.)	SAMPLE INTERVAL (ft.)	% RECOVERY	PID (ppm)	ANALYTICAL SAMPLE	SOIL DESCRIPTION and LITHOLOGIC SYMBOL	WELL CONSTRUCTION	REMARKS
0					FILL: Dry, light brown sand and gravel		
-1							
-2	0-4	60			FILL: Dry, black sand, gravel, coal-like material (CLM), and wood chips with a musty odor.		
-3							
-4							
-5							
-6	4-8	55					
-7							
-8							
					CONCRETE: Refusal at 8.2'. Concrete dust in sample shoe.		

# NO-DP41/PZ18

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 5/19/2005

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 999.44 ft. above MSL

WELL ELEVATION: 999.15 ft. above MSL

OUTER CASING ELEVATION: NA

DEPTH TO WATER: 5.18 ft. below TOC

BOREHOLE DEPTH: 24 ft. below grade

WEATHER: Warm, sunny, slight breeze

GEOLOGIST: Lara Gray

DEPTH (ft.)	SAMPLE INTERVAL (ft.)	% RECOVERY	PID (ppm)	ANALYTICAL SAMPLE	SOIL DESCRIPTION and LITHOLOGIC SYMBOL	WELL CONSTRUCTION	REMARKS	
0	0-4	75	0.0		TOPSOIL: Dry, dark brown, fine sand and angular gravel with grass and root material		Flush mount curb box	
-1			0.0					
-2			0.0					
-3			0.0					
-4	4-8	60	0.0		FILL: Dry, medium brown, fine sand with small to medium rounded gravel and a few angular clasts			Bentonite grout
-5			0.0					Water level (12/6/05)
-6			0.0					
-7			0.0					
-8	8-12	90	0.0		SAND AND GRAVEL: Wet, brown, loosely packed sand and gravel with a very slight odor and gray staining from 11.5-12'			1-inch PVC riser
-9			0.0					
-10			0.0					Sand pack
-11			0.0					
-12	12-16	50	1.0		GRAVEL: Wet, gray, small to medium gravel with a slight sheen and NAPL from 16-16.5'			0.010-inch slotted screen
-13			1.0					
-14			1.0					
-15			1.0					
-16	16-20	100	9.0	16-16.5	CLAY AND SILT: Moist, brown silt and clay with a very slight odor			Well cap
-17			4.0					
-18			3.0					
-19			1.0					
-20	20-24	90	3.0		CLAY: Moist, gray clay with some silt and a slight sheen on outside from layer above			
-21			3.0					
-22			1.0					
-23			1.0	23-23.7				
-24								

# NO-DP42/PZ22

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 6/13/2005

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 1000.88 ft. above MSL

WELL ELEVATION: 1000.55 ft. above MSL

OUTER CASING ELEVATION: NA

DEPTH TO WATER: 6.58 ft. below TOC

BOREHOLE DEPTH: 28 ft. below grade

WEATHER: Hot, humid, sunny, slight breeze

GEOLOGIST: Lara Gray

DEPTH (ft.)	SAMPLE INTERVAL (ft.)	% RECOVERY	PID (ppm)	ANALYTICAL SAMPLE	SOIL DESCRIPTION and LITHOLOGIC SYMBOL	WELL CONSTRUCTION	REMARKS	
0	0-4	85	0.0		TOPSOIL: Dry, brown silt and sand with grass		Flush mount curb box	
-1			0.0		FILL: Dry, brown to black sand and rock clasts		Bentonite grout	
-2			0.0					
-3			0.0					
-4	4-8	75	0.0		SAND AND SILT: Dry, light brown silt and fine sand with a little gravel and iron staining		1-inch PVC riser	
-5			0.0		SAND AND SILT: Dry to moist medium to coarse sand and silt		Water level (12/6/05)	
-6			0.0					
-7			0.0					
-8	8-12	75	0.0	9-10	GRAVEL AND SAND: Wet, brown, coarse sand and gravel		Sand pack	
-9			0.0		CLAY: Moist, soft, reddish-brown clay			0.010-inch slotted screen
-10			0.0					
-11			0.0					
-12	12-16	100	0.0		CLAY AND SILT: Moist, stiff, gray clay and silt			
-13			0.0		CLAY AND SILT: Moist, gray clay and silt with a little fine sand			
-14			0.0					
-15			0.0					
-16	16-20	80	0.0				Well cap	
-17			0.0					
-18			0.0					
-19			0.0					
-20	20-24	80	0.0					
-21			0.0					
-22			0.0					
-23			0.0					
-24	24-28	90	0.0	26-27				
-25			0.0					
-26			0.0					
-27			0.0					
-28								

# NO-DP43/PZ19

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 5/19/2005

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 999.99 ft. above MSL

WELL ELEVATION: 999.51 ft. above MSL

OUTER CASING ELEVATION: NA

DEPTH TO WATER: 5.58 ft. below TOC

BOREHOLE DEPTH: 24 ft. below grade

WEATHER: Warm, sunny, slight breeze

GEOLOGIST: Lara Gray

DEPTH (ft.)	SAMPLE INTERVAL (ft.)	% RECOVERY	PID (ppm)	ANALYTICAL SAMPLE	SOIL DESCRIPTION and LITHOLOGIC SYMBOL	WELL CONSTRUCTION	REMARKS
0	0-4	100	0.0		TOPSOIL: Dry, dark brown fine sand and gravel with grass and root material		Flush mount curb box
-1			0.0				
-2			0.0				
-3			0.0		FILL: Dry, black sand, coal-like material (CLM) and wood pieces		Bentonite grout
-4	4-8	60	0.0		SAND AND SILT: Dry, light brown sand and silt with some iron staining		
-5			0.0				Water level (12/6/05)
-6			0.0				
-7			0.5		SAND AND GRAVEL: Dry to moist, light brown, fine sand and small gravel		
-8	8-12	40	0.2	7.5-8	GRAVEL AND SAND: Moist to wet, loosely packed gravel and coarse sand with a slight odor from 7.3-8'		1-inch PVC riser
-9			0.2				
-10			0.2				Sand pack
-11			0.2				
-12	12-16	40	0.0		GRAVEL AND SAND: Wet gravel and coarse sand		0.010-inch slotted screen
-13			0.0				
-14			0.0				
-15			0.0				
-16	16-20	100	0.0		SILT: Moist, light brown silt with a little fine sand and clay		
-17			0.0				
-18			0.0				
-19			0.0				Well cap
-20	20-24	100	0.0		CLAY AND SAND: Moist, gray clay with a little fine sand		
-21			0.0				
-22			0.0				
-23			0.0				
-24			0.0	23-23.8			

# NO-DP44/PZ27

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 6/15/2006

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 1003.78 ft. above MSL

WELL ELEVATION: 1003.37 ft. above MSL

OUTER CASING ELEVATION: NA

DEPTH TO WATER: 8.61 ft. below TOC

BOREHOLE DEPTH: 28 ft. below grade

WEATHER: Hot, partly cloudy

GEOLOGIST: Amanda Bissell

DEPTH (ft.)	SAMPLE INTERVAL (ft.)	% RECOVERY	PID (ppm)	ANALYTICAL SAMPLE	SOIL DESCRIPTION and LITHOLOGIC SYMBOL	WELL CONSTRUCTION	REMARKS
0	0-4	100	0.0		ASPHALT		Flush mount curb box
-1			0.0				
-2			0.0		FILL: Dry, black, medium sand with gravel and some coal-like material		
-3			0.0				
-4	4-8	100	0.0				Bentonite grout
-5			0.0		SILT: Dry, brown, compact silt with some gravel		1-inch PVC riser
-6			0.0				
-7			0.0		CLAY AND SILT: Dry, brown, compact silt and clay with iron staining and a little gravel		
-8	8-12	80	0.0				Water level (12/6/05)
-9			0.0				
-10			0.0		SAND AND GRAVEL: Moist, brown, medium sand with small gravel and some clay		
-11			0.0				
-12	12-16	60	0.0	15-16	GRAVEL AND SAND: Moist to wet, brown, loosely packed gravel with coarse sand		Sand pack
-13			0.0				
-14			0.0				
-15			0.0				0.010-inch slotted screen
-16	16-20	100	0.0				
-17			0.0		CLAY AND SILT: Moist, brown to gray clay and interbedded silt with iron staining		
-18			0.0				
-19			0.0				
-20	20-24	25	0.0				
-21			0.0				
-22			0.0				
-23			0.0				
-24	24-28	100	0.0	25-26	CLAY AND SILT: Moist, gray, compact clay with interbedded silt		Well cap
-25			0.0				
-26			0.0				
-27			0.0				
-28							



# NO-DP45

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 6/15/2005

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 1004.52 ft. above MSL

WELL ELEVATION: NA



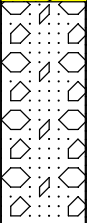
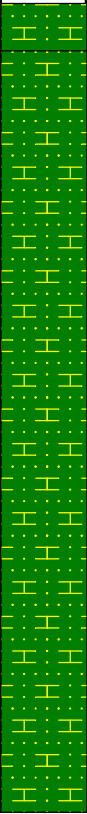
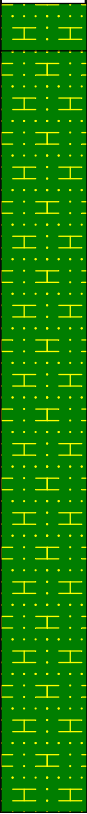
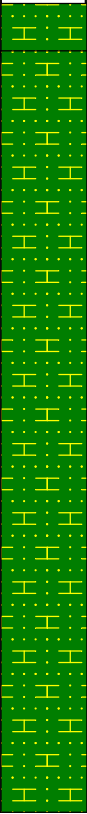
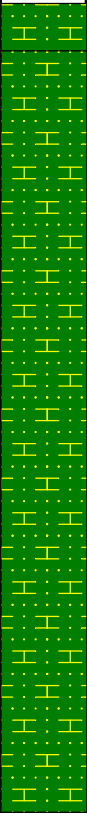
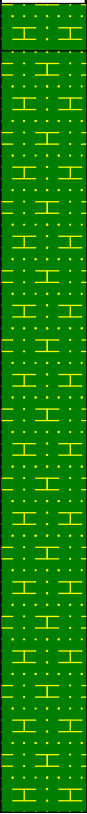
OUTER CASING ELEVATION: NA

DEPTH TO WATER: NA

BOREHOLE DEPTH: 28 ft. below grade

WEATHER: Warm, cloudy, few showers

GEOLOGIST: Amanda Bissell

DEPTH (ft.)	SAMPLE INTERVAL (ft.)	% RECOVERY	PID (ppm)	ANALYTICAL SAMPLE	SOIL DESCRIPTION and LITHOLOGIC SYMBOL	WELL CONSTRUCTION	REMARKS	
0	0-4	95	0.0		ASPHALT			
-1			0.0		FILL: Dry, black, medium sand with gravel and some coal-like material			
-2			4.5					
-3			0.0					
-4	4-8	75	0.0		SAND AND GRAVEL: Dry to moist, brown, fine to coarse sand and gravel with trace clay and iron staining			
-5			4.5					
-6			5.7					
-7			0.0					
-8	8-12	95	0.0	10.8-11.3	CLAY AND SILT: Dry, brown, compact silt and clay with iron staining and a little gravel			
-9			1.5					
-10			1.1					
-11			0.0					
-12	12-16	95	0.0		CLAY AND SILT: Moist, dark gray, interbedded clay and silt			
-13			0.0					
-14			0.0					
-15			0.0					
-16	16-20	100	0.0					
-17			0.2					
-18			0.0					
-19			1.3					
-20	20-24	98	0.0					
-21			0.5					
-22			0.0					
-23			0.0					
-24	24-28	80	0.0	26-27				
-25			0.0					
-26			0.0					
-27			0.0					
-28								

# NO-DP46/PZ23

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 6/14/2005

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 1001.56 ft. above MSL

WELL ELEVATION: 1001.21 ft. above MSL

OUTER CASING ELEVATION: NA

DEPTH TO WATER: 6.94 ft. below TOC

BOREHOLE DEPTH: 24 ft. below grade

WEATHER: Hot, humid, few showers

GEOLOGIST: Lara Gray

DEPTH (ft.)	SAMPLE INTERVAL (ft.)	% RECOVERY	PID (ppm)	ANALYTICAL SAMPLE	SOIL DESCRIPTION and LITHOLOGIC SYMBOL	WELL CONSTRUCTION	REMARKS
0	0-4	60	0.0		TOPSOIL: Dry to moist, black silt and sand with some root material		Flush mount curb box
-1			0.0				
-2			0.0				
-3			0.0				
-4	4-8	60	0.0		SAND AND GRAVEL: Moist, brown, fine to medium sand with some gravel		Bentonite grout
-5			0.0				
-6			0.0				
-7			0.0				
-8	8-12	80	0.0	9-9.6	GRAVEL: Wet, brown, small gravel with some clay		1-inch PVC riser
-9			0.0				
-10			0.0				
-11			0.0				
-12	12-16	100	0.0		CLAY AND SILT: Moist, brown to gray silt and clay		Water level (12/6/05)
-13			0.0				
-14			0.0				
-15			0.0				
-16	16-20	100	0.0		CLAY AND SAND: Moist, gray clay with fine sand		Sand pack
-17			0.0				
-18			0.0				
-19			0.0				
-20	20-24	100	0.0	22-24			0.010-inch slotted screen
-21			0.0				
-22			0.0				
-23			0.0				
-24							Well cap

# NO-DP47/PZ26

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 6/15/2005

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 1004.61 ft. above MSL

WELL ELEVATION: 1004.18 ft. above MSL

OUTER CASING ELEVATION: NA

DEPTH TO WATER: 9.41 ft. below TOC

BOREHOLE DEPTH: 28 ft. below grade

WEATHER: Hot, humid, sunny

GEOLOGIST: Amanda Bissell

DEPTH (ft.)	SAMPLE INTERVAL (ft.)	% RECOVERY	PID (ppm)	ANALYTICAL SAMPLE	SOIL DESCRIPTION and LITHOLOGIC SYMBOL	WELL CONSTRUCTION	REMARKS			
0	0-4	100	0.0		ASPHALT		Flush mount curb box			
-1			0.0		FILL: Dry, loose, coarse sand and gravel		Bentonite grout			
-2			0.0							
-3			0.0							
-4	4-8	100	0.0		FILL: Dry, black, medium to coarse sand with gravel and some asphalt-like material		1-inch PVC riser			
-5			0.0		CLAY AND SILT: Dry, brown, compact silt and clay with iron staining					
-6			0.0							
-7			0.0							
-8	8-12	80	0.0		SAND AND GRAVEL: Dry to moist, brown, medium to coarse sand and small gravel		Water level (12/6/05)			
-9			0.3							
-10			0.0							
-11			0.0							
-12	12-16	50	0.0		GRAVEL AND SAND: Wet, brown, loosely packed gravel with coarse sand		Sand pack			
-13			0.0							
-14			0.0							
-15			0.0		GRAVEL AND SAND: Wet, brown, loosely packed gravel with coarse sand		0.010-inch slotted screen			
-16	16-20	50	0.0							
-17			0.0							
-18			0.0							
-19			0.0	CLAY AND SILT: Moist, brown to gray clay and interbedded silt with iron staining		Well cap				
-20	20-24	60	0.0				21.5-22.5			
-21			0.0							
-22			0.0							
-23			0.0	CLAY AND SILT: Moist, gray, compact clay with interbedded silt						
-24	24-28	100	0.0	26-27						
-25			0.0							
-26			0.0							
-27			0.0							
-28										

# NO-DP48/PZ24

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 6/14/2005

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 1003.60 ft. above MSL

WELL ELEVATION: 1003.27 ft. above MSL

OUTER CASING ELEVATION: NA

DEPTH TO WATER: 9.35 ft. below TOC

BOREHOLE DEPTH: 28 ft. below grade

WEATHER: Hot, partly sunny, humid

GEOLOGIST: Lara Gray

DEPTH (ft.)	SAMPLE INTERVAL (ft.)	% RECOVERY	PID (ppm)	ANALYTICAL SAMPLE	SOIL DESCRIPTION and LITHOLOGIC SYMBOL	WELL CONSTRUCTION	REMARKS
0							
-1	0-4	75			FILL: Dry, brown to black, sand, gravel, wood, ash-like material, and coal-like material		Flush mount curb box
-2							
-3							Bentonite grout
-4							
-5	4-8	80			SAND AND SILT: Dry to moist, light brown, fine sand and silt with iron staining		1-inch PVC riser
-6							
-7					SAND AND SILT: Moist, brown silt and sand with a little gravel and red iron staining		
-8							
-9	8-12	50					Water level (12/6/05)
-10							Sand pack
-11							
-12					GRAVEL AND SAND: Wet, reddish-brown, coarse sand and gravel		0.010-inch slotted screen
-13	12-16	40					
-14					GRAVEL AND SAND: Wet, reddish-brown, coarse sand and gravel		
-15							
-16	16-20	50					
-17							
-18				18-19	GRAVEL AND SAND: As above with a slight odor		
-19							
-20					CLAY AND SILT: Moist, reddish-brown clay and silt		
-21	20-24	100					Well cap
-22					CLAY: Moist, gray clay		
-23							
-24							
-25	24-28	100			CLAY AND SAND: Moist, gray clay with fine sand		
-26				26-27			
-27							
-28							

# NO-DP49/PZ25

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 6/14/2005

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 1002.78 ft. above MSL

WELL ELEVATION: 1002.43 ft. above MSL

OUTER CASING ELEVATION: NA

DEPTH TO WATER: 8.84 ft. below TOC

BOREHOLE DEPTH: 28 ft. below grade

WEATHER: Hot, humid, sunny

GEOLOGIST: Lara Gray

DEPTH (ft.)	SAMPLE INTERVAL (ft.)	% RECOVERY	PID (ppm)	ANALYTICAL SAMPLE	SOIL DESCRIPTION and LITHOLOGIC SYMBOL	WELL CONSTRUCTION	REMARKS
0	0-4	70	0.0		TOPSOIL: Dry, brown silt and sand with grass	0	Flush mount curb box
-1			0.3			-1	
-2			0.0			-2	
-3	4-8	75	0.0		FILL: Dry to moist, black sand, wood, ash-like material, and coal-like material	-3	Bentonite grout
-4			0.0			-4	
-5			0.0			-5	1-inch PVC riser
-6	8-12	65	0.0		SAND AND SILT: Dry to moist, light brown silt with fine sand and iron staining	-6	
-7			0.0			-7	
-8			0.0			-8	
-9	12-16	60	0.0		SAND: Moist to wet, brown, medium to coarse sand	-9	Water level (12/6/05)
-10			4.0			-10	Sand pack
-11			0.0		SAND AND GRAVEL: Moist to wet, brown, medium to coarse sand with a little gravel	-11	
-12	16-20	75	0.0	17-18	GRAVEL AND SAND: Wet, brown, loosely packed, coarse sand and gravel	-12	0.010-inch slotted screen
-13			0.0			-13	
-14			0.0			-14	
-15	20-24	100	0.0		GRAVEL AND SAND: As above with a very slight odor	-15	
-16			0.2			-16	
-17			0.5			-17	
-18	24-28	100	0.0	26-27	CLAY AND SILT: Moist, reddish-brown clay and silt	-18	
-19			0.0			-19	
-20			0.0		SAND AND SILT: Moist, gray, fine sand and silt	-20	Well cap
-21			0.0		CLAY AND SAND: Moist, gray clay and fine sand	-21	
-22			0.0			-22	
-23			0.0			-23	
-24			0.0			-24	
-25			0.0			-25	
-26			0.0			-26	
-27			0.0			-27	
-28			0.0			-28	

# NO-DP50/PZ28

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 6/16/2005

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 999.17 ft. above MSL

WELL ELEVATION: 998.79 ft. above MSL

OUTER CASING ELEVATION: NA

DEPTH TO WATER: 5.14 ft. below TOC

BOREHOLE DEPTH: 28 ft. below grage

WEATHER: Warm, cloudy, breezy

GEOLOGIST: Amanda Bissell

DEPTH (ft.)	SAMPLE INTERVAL (ft.)	% RECOVERY	PID (ppm)	ANALYTICAL SAMPLE	SOIL DESCRIPTION and LITHOLOGIC SYMBOL	WELL CONSTRUCTION	REMARKS
0	0-4	80	0.0		TOPSOIL: Dry, brown silt and fine sand with grass	0	Flush mount curb box
-1			2.2		FILL: Dry, black gravel with ash-like material, coal-like material and some root material	-1	Bentonite grout
-2			1.6			-2	
-3			1.3			-3	
-4	4-8	60	0.6		SAND AND GRAVEL: Dry to moist, brown, fine to coarse sand and gravel with trace clay and iron staining	-4	1-inch PVC riser Water level (12/6/05)
-5			1.6		-5		
-6			1.3		-6		
-7			1.1		-7		
-8	8-12	70	0.4		GRAVEL AND SAND: Wet, brown, gravel and coarse sand with trace clay	-8	Sand pack
-9			0.0		-9		
-10			0.0		-10		
-11			0.0		-11		
-12	12-16	75	0.0	13.7-15.5	GRAVEL AND SAND: As above with a slight odor from 10-10.5'	-12	0.010-inch slotted screen
-13			0.0		-13		
-14			0.0		-14		
-15			0.0		-15		
-16	16-20	100	0.0		CLAY: Moist, brown compact clay	-16	Well cap
-17			0.0		-17		
-18			0.0		-18		
-19			0.0		-19		
-20	20-24	100	0.0		CLAY AND SILT: Moist, gray, interbedded clay and silt	-20	
-21			0.0		-21		
-22			0.0		-22		
-23			0.0		-23		
-24	24-28	100	0.0	25-26		-24	
-25			0.0		-25		
-26			0.0		-26		
-27			0.0		-27		
-28						-28	

# NO-DP51/PZ29

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 10/10/2005

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 999.29 ft. above MSL

WELL ELEVATION: 998.91 ft. above MSL

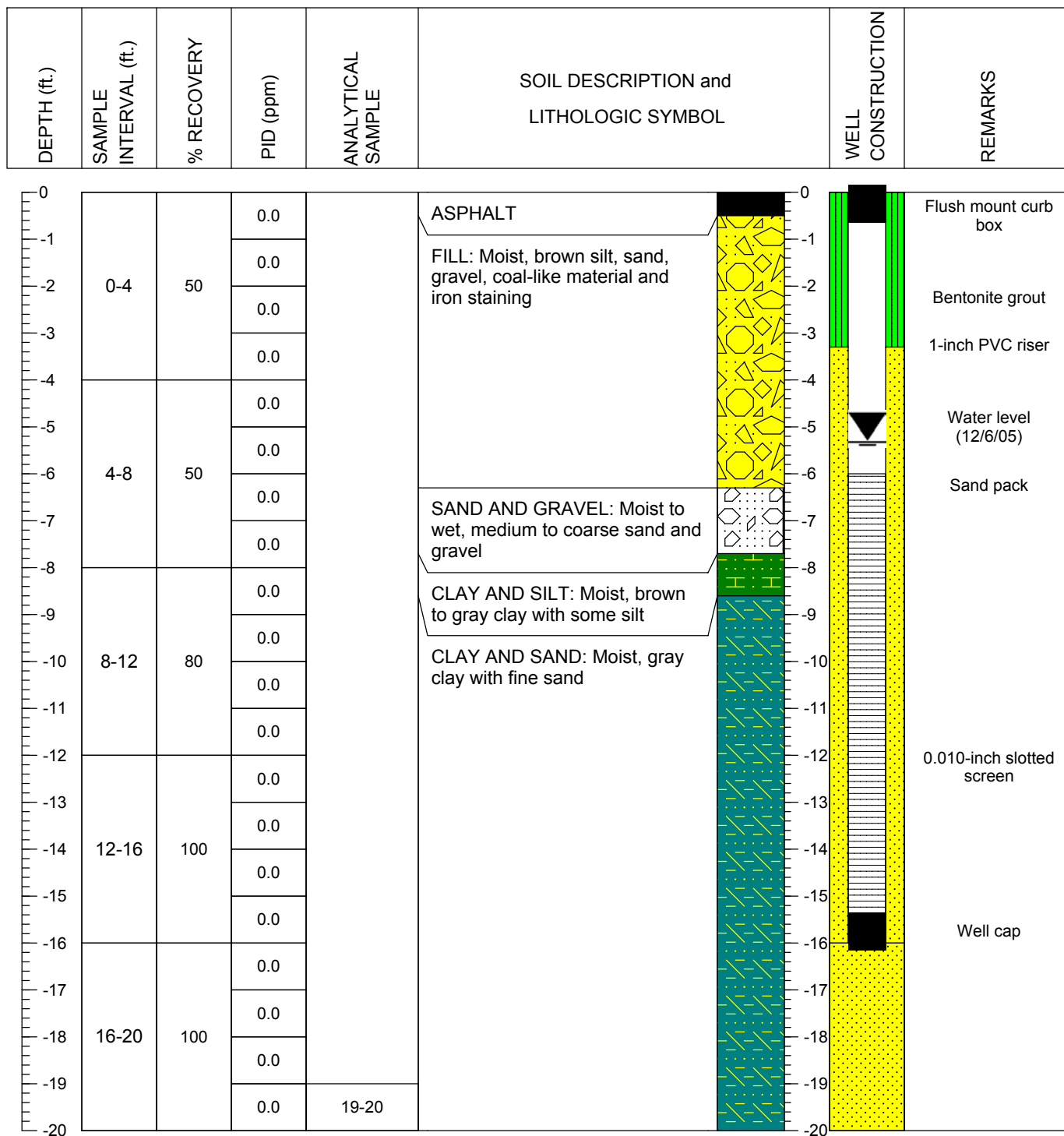
OUTER CASING ELEVATION: NA

DEPTH TO WATER: 5.05 ft. below TOC

BOREHOLE DEPTH: 20 ft. below grade

WEATHER: Cool, overcast, misty

GEOLOGIST: Lara Gray



# NO-DP52/PZ30

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 10/10/2005

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 998.53 ft. above MSL

WELL ELEVATION: 998.23 ft. above MSL

OUTER CASING ELEVATION: NA

DEPTH TO WATER: 5.39 ft. below TOC

BOREHOLE DEPTH: 20 ft. below grade

WEATHER: Cool, overcast

GEOLOGIST: Lara Gray

DEPTH (ft.)	SAMPLE INTERVAL (ft.)	% RECOVERY	PID (ppm)	ANALYTICAL SAMPLE	SOIL DESCRIPTION and LITHOLOGIC SYMBOL	WELL CONSTRUCTION	REMARKS	
0	0-4	70	0.0		TOPSOIL: Moist, dark brown silt, fine sand, and gravel with root material	0	Flush mount curb box	
-1			0.0		FILL: Moist, brown silt, sand, gravel, and concrete	-1	Bentonite grout	
-2			0.0			-2		
-3			0.0			-3		
-4	4-8	80	0.0		SAND AND GRAVEL: Moist, light orangey-brown sand and silt with gravel and some iron staining	-4	1-inch PVC riser	
-5			0.0			-5		
-6			0.0			-6		
-7			0.0			-7		
-8	8-12	100	0.0		GRAVEL AND SAND: Wet, brown gravel and medium to coarse sand	-8	Water level (12/6/05)	
-9			0.0		-9			
-10			0.0		-10			
-11			0.0		-11			
-12	12-16	95	0.0		CLAY AND SAND: Moist, gray clay with some fine sand	-12	Sand pack	
-13			0.0			-13		
-14			0.0			-14		
-15			0.0			-15		
-16	16-20	50	0.0			-16	0.010-inch slotted screen	
-17			0.0			-17		
-18			0.0			-18		
-19			0.0			-19		
-20			0.0	19-20		-20	Well cap	



# NO-DP53/PZ31

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 10/10/2005

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 998.34 ft. above MSL

WELL ELEVATION: 997.93 ft. above MSL

OUTER CASING ELEVATION: NA

DEPTH TO WATER: 6.71 ft. below TOC

BOREHOLE DEPTH: 20 ft. below grade

WEATHER: Cool, overcast

GEOLOGIST: Lara Gray

DEPTH (ft.)	SAMPLE INTERVAL (ft.)	% RECOVERY	PID (ppm)	ANALYTICAL SAMPLE	SOIL DESCRIPTION and LITHOLOGIC SYMBOL	WELL CONSTRUCTION	REMARKS	
0	0-4	80	0.0		TOPSOIL: Moist, dark brown silt and fine sand with root material	0	Flush mount curb box	
-1			0.0		FILL: Moist, brown silt, sand, and gravel	-1	Bentonite grout	
-2			0.0			-2		
-3			0.0			-3		
-4	4-8	70	0.0		SAND AND GRAVEL: Moist, brown, medium to coarse sand and gravel	-4	1-inch PVC riser	
-5			0.0		GRAVEL AND SAND: Wet, brown gravel and medium to coarse sand	-5		
-6			0.0			-6		
-7			0.0			-7		
-8	8-12	100	0.0		CLAY AND SAND: Moist, reddish-brown clay with fine sand and silt	-8	Sand pack Water level (12/6/05)	
-9			0.0			-9		
-10			0.0			-10		
-11			0.0		CLAY AND SAND: Moist, gray clay with some fine sand	-11		
-12	12-16	100	0.0			-12	0.010-inch slotted screen	
-13			0.0			-13		
-14			0.0			-14		
-15			0.0			-15		
-16	16-20	100	0.0			-16	Well cap	
-17			0.0			-17		
-18			0.0			-18		
-19			0.0			-19		
-20			0.0	19-20		-20		

# NO-DP54/PZ32

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 10/11/2005

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 1000.99 ft. above MSL

WELL ELEVATION: 1000.62 ft. above MSL

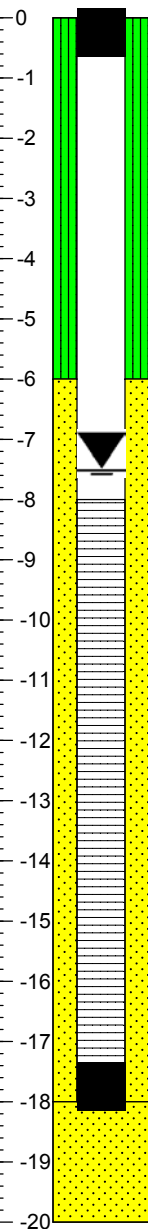
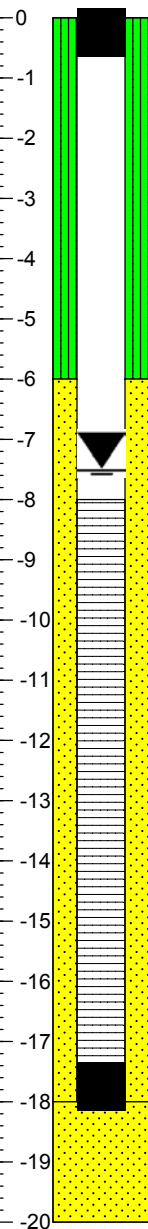
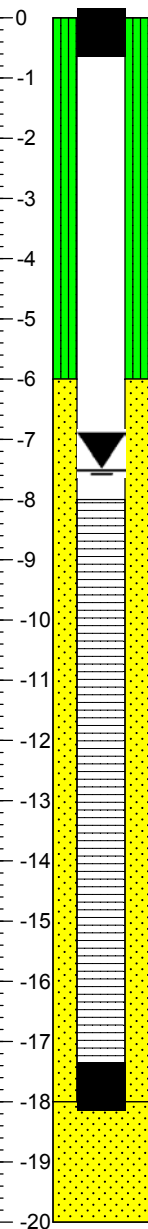
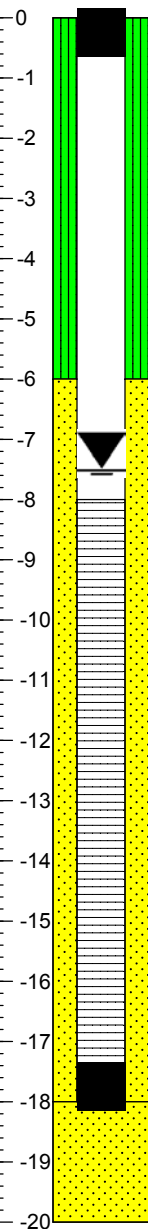
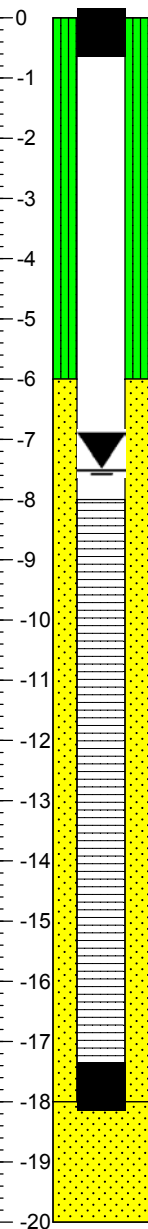
OUTER CASING ELEVATION: NA

DEPTH TO WATER: 7.23 ft. below TOC

BOREHOLE DEPTH: 20 ft. below grade

WEATHER: Cool, overcast, slight breeze

GEOLOGIST: Lara Gray

DEPTH (ft.)	SAMPLE INTERVAL (ft.)	% RECOVERY	PID (ppm)	ANALYTICAL SAMPLE	SOIL DESCRIPTION and LITHOLOGIC SYMBOL	WELL CONSTRUCTION	REMARKS
0	0-4	75	0.0		TOPSOIL: Moist, dark brown silt, fine sand, and gravel with root material		Flush mount curb box
-1			0.0		FILL: Moist, brown silt, sand, and gravel		Bentonite grout
-2			0.0				1-inch PVC riser
-3			0.0				
-4	4-8	65	0.0		SAND: Moist, grayish-brown, fine sand with trace gravel		
-5			0.0		SAND AND GRAVEL: Moist to wet, orangey-brown, fine to coarse sand and gravel		
-6			0.0				Sand pack
-7			0.0				Water level (12/6/05)
-8	8-12	50	0.0		GRAVEL AND SAND: Wet, brown gravel and medium to coarse sand		
-9			0.0				
-10			0.0				
-11			0.0		CLAY AND SAND: Moist, reddish-brown clay with fine sand and silt		0.010-inch slotted screen
-12	12-16	100	0.0				
-13			0.0				
-14			0.0	CLAY AND SAND: Moist, gray clay with some fine sand			
-15			0.0				
-16	16-20	100	0.0				Well cap
-17			0.0				
-18			0.0				
-19			0.0				
-20			0.0	19-20			

# NO-DP55/PZ33

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 10/11/2005

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 1003.40 ft. above MSL

WELL ELEVATION: 1003.00 ft. above MSL

OUTER CASING ELEVATION: NA

DEPTH TO WATER: 8.94 ft. below TOC

BOREHOLE DEPTH: 24 ft. below grade

WEATHER: Cool, overcast, slight breeze

GEOLOGIST: Lara Gray

DEPTH (ft.)	SAMPLE INTERVAL (ft.)	% RECOVERY	PID (ppm)	ANALYTICAL SAMPLE	SOIL DESCRIPTION and LITHOLOGIC SYMBOL	WELL CONSTRUCTION	REMARKS
0					TOPSOIL: Moist, dark brown silt, fine sand, and gravel with root material	0	Flush mount curb box
-1							
-2	0-4	60			FILL: Moist, orangey-brown silt, sand, and gravel	-2	Bentonite grout
-3							1-inch PVC riser
-4					SAND AND SILT: Moist, orangey-brown silt and fine sand with trace gravel and iron staining	-4	
-5							
-6	4-8	75			SAND AND GRAVEL: Moist, brown, medium to coarse sand and gravel with iron staining	-6	
-7							
-8							Sand pack
-9							Water level (12/6/05)
-10	8-12	70			GRAVEL AND SAND: Wet, brown gravel and medium to coarse sand	-10	
-11							
-12							0.010-inch slotted screen
-13					GRAVEL AND SAND: Wet, brown gravel and medium to coarse sand	-13	
-14	12-16	55					
-15							
-16					CLAY AND SAND: Moist, reddish-brown clay with fine sand and silt	-16	
-17							
-18	16-20	100			CLAY AND SAND: Moist, gray clay with some fine sand	-18	
-19							Well cap
-20							
-21							
-22	20-24	100					
-23							
-24				23-24			

# NO-DP56/PZ34

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 10/11/2005

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 1002.41 ft. above MSL

WELL ELEVATION: 1002.02 ft. above MSL

OUTER CASING ELEVATION: NA

DEPTH TO WATER: 8.11 ft. below TOC

BOREHOLE DEPTH: 20 ft. below grade

WEATHER: Cool, overcast, slight breeze

GEOLOGIST: Lara Gray

DEPTH (ft.)	SAMPLE INTERVAL (ft.)	% RECOVERY	PID (ppm)	ANALYTICAL SAMPLE	SOIL DESCRIPTION and LITHOLOGIC SYMBOL	WELL CONSTRUCTION	REMARKS
0	0-4	100	0.0		TOPSOIL: Moist, dark brown silt, fine sand, and gravel with root material	0	Flush mount curb box
-1			0.0		FILL: Dry, brown silt, sand, gravel, coal-like material, and concrete	-1	Bentonite grout
-2			0.0			-2	
-3			0.0			-3	
-4	4-8	90	0.0		SAND: Dry to moist, brown, fine sand with trace gravel and iron staining	-4	1-inch PVC riser
-5			0.0			-5	
-6			0.0			-6	
-7			0.0			-7	
-8	8-12	40	0.0		SAND AND GRAVEL: Moist, brown, medium to coarse sand and gravel with iron staining	-8	Sand pack
-9			0.0			-9	
-10			0.0			-10	
-11			0.0			-11	
-12	12-16	80	0.0		CLAY AND SAND: Moist, gray clay with some fine sand	-12	Water level (12/6/05)
-13			0.0			-13	
-14			0.0			-14	
-15			0.0			-15	
-16	16-20	80	0.0			-16	0.010-inch slotted screen
-17			0.0			-17	
-18			0.0			-18	
-19			0.0			-19	
-20			0.0	19-20		-20	Well cap

# NO-DP57/PZ35

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 10/11/2005

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 1001.52 ft. above MSL

WELL ELEVATION: 1001.25 ft. above MSL

OUTER CASING ELEVATION: NA

DEPTH TO WATER: 7.15 ft. below TOC

BOREHOLE DEPTH: 20 ft. below grade

WEATHER: Cool, overcast, slight breeze

GEOLOGIST: Lara Gray

DEPTH (ft.)	SAMPLE INTERVAL (ft.)	% RECOVERY	PID (ppm)	ANALYTICAL SAMPLE	SOIL DESCRIPTION and LITHOLOGIC SYMBOL	WELL CONSTRUCTION	REMARKS
0	0-4	50	0.0		TOPSOIL: Moist, dark brown silt, fine sand, and gravel with root material	0	Flush mount curb box
-1			0.0		FILL: Moist, brown silt, sand, and gravel	-1	Bentonite grout
-2			0.0			-2	
-3			0.0			-3	
-4	4-8	65	0.0		SAND AND GRAVEL: Wet, brown, medium to coarse sand and gravel with iron staining	-4	1-inch PVC riser
-5			0.0			-5	
-6			0.0			-6	
-7			0.0			-7	
-8	8-12	65	0.0		CLAY AND SAND: Moist, gray clay with some fine sand	-8	Sand pack
-9			0.0			-9	
-10			0.0			-10	
-11			0.0			-11	
-12	12-16	75	0.0			-12	0.010-inch slotted screen
-13			0.0			-13	
-14			0.0			-14	
-15			0.0			-15	
-16	16-20	90	0.0			-16	Well cap
-17			0.0			-17	
-18			0.0			-18	
-19			0.0			-19	
-20			0.0	19-20		-20	

# NO-DP58/PZ36

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 10/12/2005

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 1000.10 ft. above MSL

WELL ELEVATION: 999.82 ft. above MSL

OUTER CASING ELEVATION: NA

DEPTH TO WATER: 7.87 ft. below TOC

BOREHOLE DEPTH: 20 ft. below grade

WEATHER: Cool, overcast, few showers

GEOLOGIST: Lara Gray

DEPTH (ft.)	SAMPLE INTERVAL (ft.)	% RECOVERY	PID (ppm)	ANALYTICAL SAMPLE	SOIL DESCRIPTION and LITHOLOGIC SYMBOL	WELL CONSTRUCTION	REMARKS	
0	0-4	90	0.0		FILL: Dry, brown sand and gravel		Flush mount curb box	
-1			0.0					
-2			0.0		FILL: Dry, dark brown sand, gravel, and coal-like material		Bentonite grout	
-3			0.0				1-inch PVC riser	
-4	4-8	80	0.0		SAND AND GRAVEL: Dry to moist, orangey-brown, fine sand and gravel			
-5			0.0					
-6			0.0				Sand pack	
-7			0.0					
-8	8-12	70	0.0		GRAVEL AND SAND: Wet, brown gravel and coarse sand		Water level (12/6/05)	
-9			0.0					
-10			0.0		CLAY AND SILT: Moist, reddish-brown clay and silt			
-11			0.0					
-12	12-16	100	0.0		CLAY AND SAND: Moist, gray clay with fine sand		0.010-inch slotted screen	
-13			0.0					
-14			0.0					
-15			0.0					
-16	16-20	100	0.0				Well cap	
-17			0.0					
-18			0.0					
-19			0.0					
-20			0.0	19-20				

# NO-DP59/PZ37

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 10/12/2005

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 999.71 ft. above MSL

WELL ELEVATION: 999.44 ft. above MSL

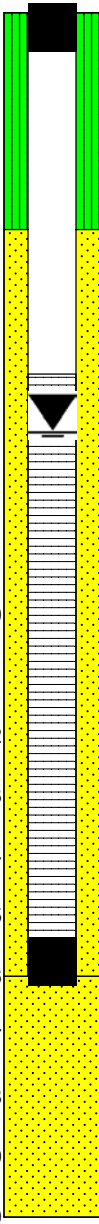
OUTER CASING ELEVATION: NA

DEPTH TO WATER: 6.69 ft. below TOC

BOREHOLE DEPTH: 20 ft. below grade

WEATHER: Cool, overcast, few showers

GEOLOGIST: Lara Gray

DEPTH (ft.)	SAMPLE INTERVAL (ft.)	% RECOVERY	PID (ppm)	ANALYTICAL SAMPLE	SOIL DESCRIPTION and LITHOLOGIC SYMBOL	WELL CONSTRUCTION	REMARKS
0	0-4	75	0.0		TOPSOIL: Moist, dark brown silt and fine sand with root material		Flush mount curb box
-1			0.0		FILL: Dry to moist, gray sand and gravel		Bentonite grout
-2			0.0				
-3			0.0				
-4	4-8	75	0.0		SAND AND GRAVEL: Moist to wet, orangey-brown, fine to medium sand and gravel with iron staining		1-inch PVC riser
-5			0.0				
-6			0.0				
-7			0.0				
-8	8-12	0	0.0		NO RECOVERY		Water level (12/6/05)
-9							
-10							
-11							
-12	12-16	100	0.0		CLAY AND SAND: Moist, gray clay with fine sand		Sand pack
-13			0.0				
-14			0.0				
-15			0.0				
-16	16-20	100	0.0				0.010-inch slotted screen
-17			0.0				
-18			0.0				
-19			0.0				
-20				19-20		Well cap	

# NO-DP60/PZ38

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 10/12/2005

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 1000.37 ft. above MSL

WELL ELEVATION: 1000.18 ft. above MSL

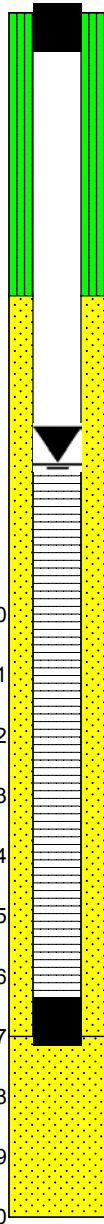
OUTER CASING ELEVATION: NA

DEPTH TO WATER: 7.22 ft. below TOC

BOREHOLE DEPTH: 20 ft. below grade

WEATHER: Cool, overcast, heavy rain

GEOLOGIST: Lara Gray

DEPTH (ft.)	SAMPLE INTERVAL (ft.)	% RECOVERY	PID (ppm)	ANALYTICAL SAMPLE	SOIL DESCRIPTION and LITHOLOGIC SYMBOL	WELL CONSTRUCTION	REMARKS	
0	0-4	80	0.0		TOPSOIL: Moist, dark brown silt and fine sand with root material		Flush mount curb box	
-1			0.0		FILL: Moist, brown silt, sand, and gravel		Bentonite grout	
-2			0.0				1-inch PVC riser	
-3			0.0					
-4	4-8	70	0.0		SAND AND GRAVEL: Moist, brown sand and gravel			
-5			0.0					
-6			0.0				Sand pack	
-7			0.0				Water level (12/6/05)	
-8	8-12	25	0.0		GRAVEL AND SAND: Wet, orangey-brown gravel and sand			
-9			0.0					
-10			0.0					
-11			0.0					
-12	12-16	15	0.0		GRAVEL AND SAND: Wet, orangey-brown gravel and sand		0.010-inch slotted screen	
-13			0.0					
-14			0.0					
-15			0.0					
-16	16-20	90	0.0		CLAY AND SAND: Moist, gray clay with fine sand			Well cap
-17			0.0					
-18			0.0					
-19			0.0					
-20			0.0	19-20				



# NO-DP61/PZ39

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 10/12/2005

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 999.41 ft. above MSL

WELL ELEVATION: 999.05 ft. above MSL

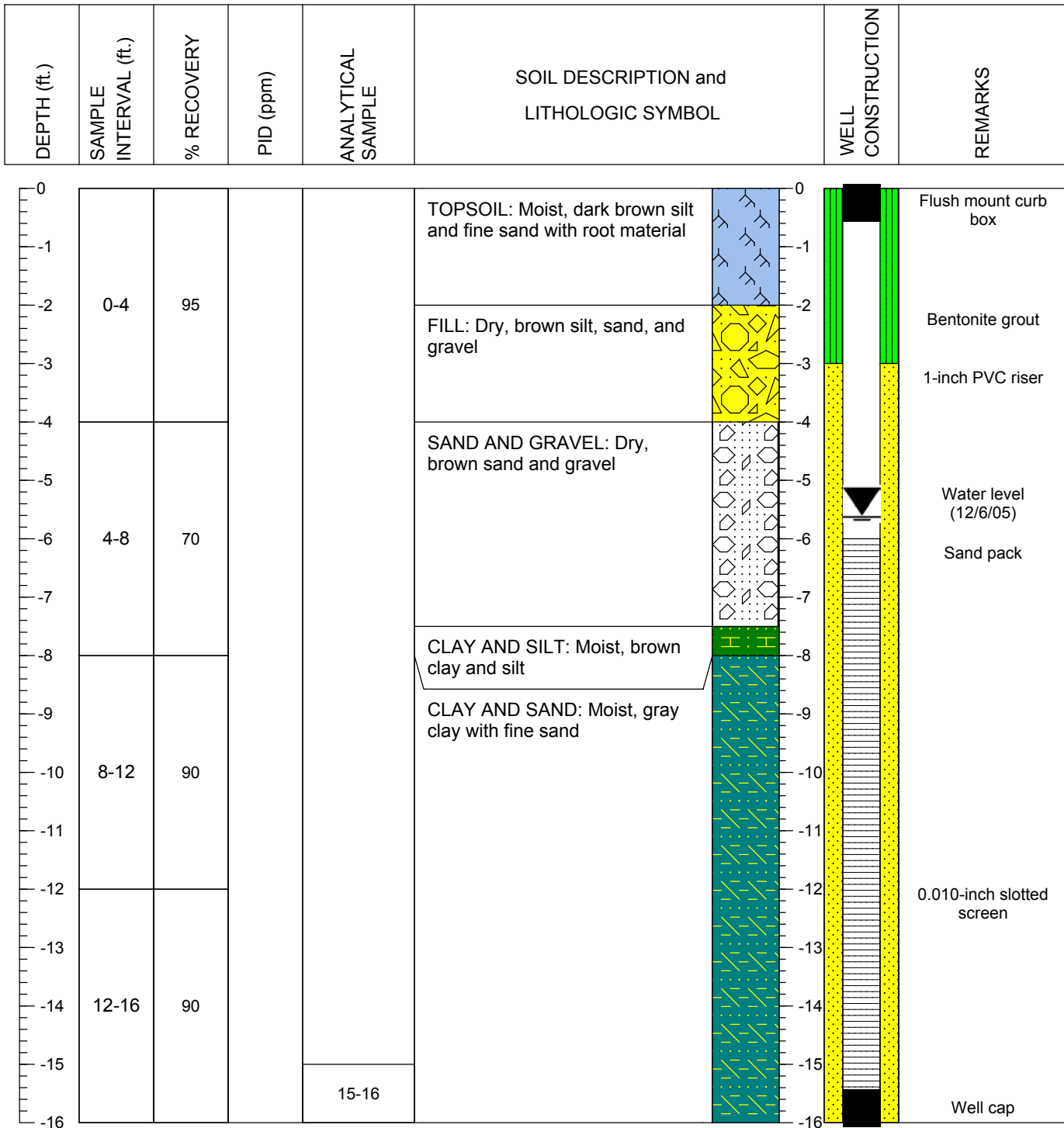
OUTER CASING ELEVATION: NA

DEPTH TO WATER: 5.40 ft. below TOC

BOREHOLE DEPTH: 16 ft. below grade

WEATHER: Cool, overcast, heavy rain

GEOLOGIST: Lara Gray



# NO-PZ01

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 10/27/2004

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 1004.30 ft. above MSL

WELL ELEVATION: 1003.74 ft. above MSL

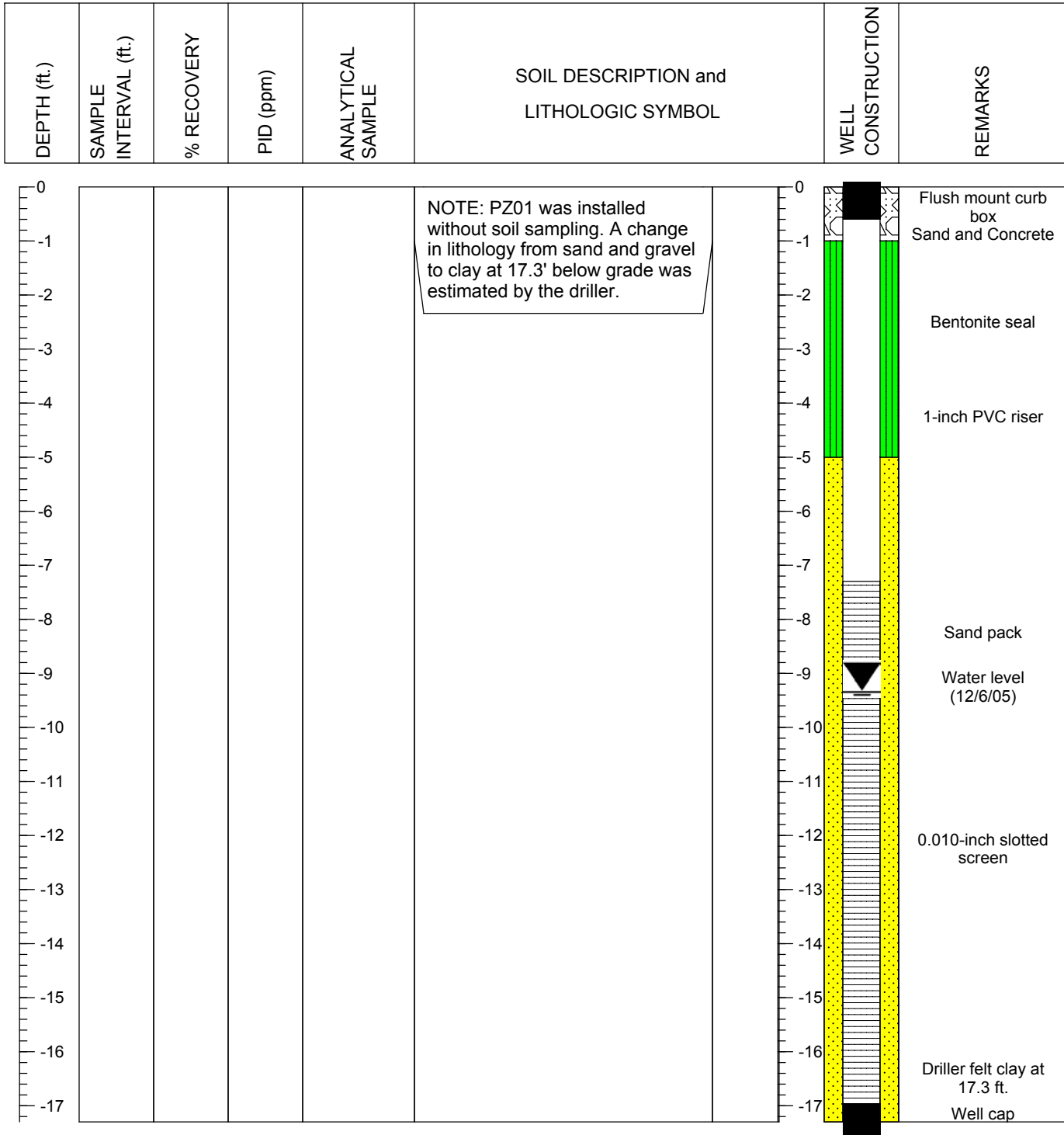
OUTER CASING ELEVATION: NA

DEPTH TO WATER: 9.10 ft. below TOC

BOREHOLE DEPTH: 17.3 ft. below grade

WEATHER: Not recorded

GEOLOGIST: Pete DeClercq



# NO-PZ02

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 10/27/2004

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 1004.18 ft. above MSL

WELL ELEVATION: 1003.91 ft. above MSL

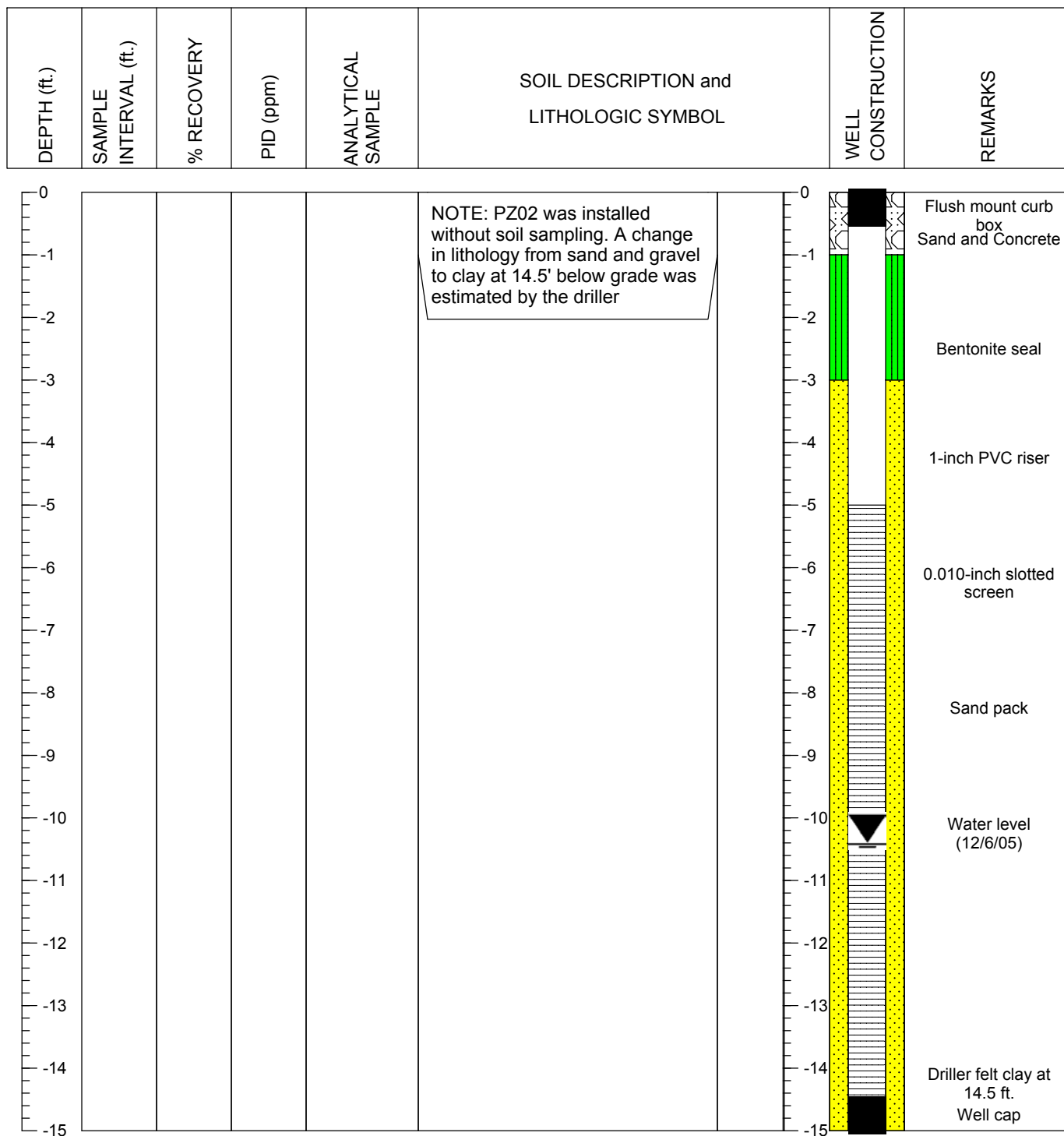
OUTER CASING ELEVATION: NA

DEPTH TO WATER: 10.21 ft. below TOC

BOREHOLE DEPTH: 15 ft. below grade

WEATHER: Not recorded

GEOLOGIST: Pete DeClercq



# NO-PZ03

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 10/27/2004

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Direct Push with CME55

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 1003.63 ft. above MSL

WELL ELEVATION: 1003.35 ft. above MSL

OUTER CASING ELEVATION: NA

DEPTH TO WATER: 8.62 ft. below TOC

BOREHOLE DEPTH: 17.5 ft. below grade

WEATHER: Not recorded

GEOLOGIST: Pete DeClercq

DEPTH (ft.)	SAMPLE INTERVAL (ft.)	% RECOVERY	PID (ppm)	ANALYTICAL SAMPLE	SOIL DESCRIPTION and LITHOLOGIC SYMBOL	WELL CONSTRUCTION	REMARKS
0					NOTE: PZ03 was installed without soil sampling. A change in lithology from sand and gravel to clay at 17.5' below grade was estimated by the driller.	0	Flush mount curb box
-1						-1	Sand and Concrete
-2						-2	Bentonite seal
-3						-3	
-4						-4	1-inch PVC riser
-5						-5	
-6						-6	
-7						-7	
-8						-8	
-9						-9	Water level (12/6/05)
-10						-10	Sand pack
-11						-11	
-12						-12	0.010-inch slotted screen
-13						-13	
-14						-14	
-15						-15	
-16						-16	Driller felt clay at 17.5 ft.
-17						-17	Well cap

# NO-PZ07

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 10/28/2004

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Trailer-mounted Direct Push Rig

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 1002.19 ft. above MSL

WELL ELEVATION: 1001.91 ft. above MSL

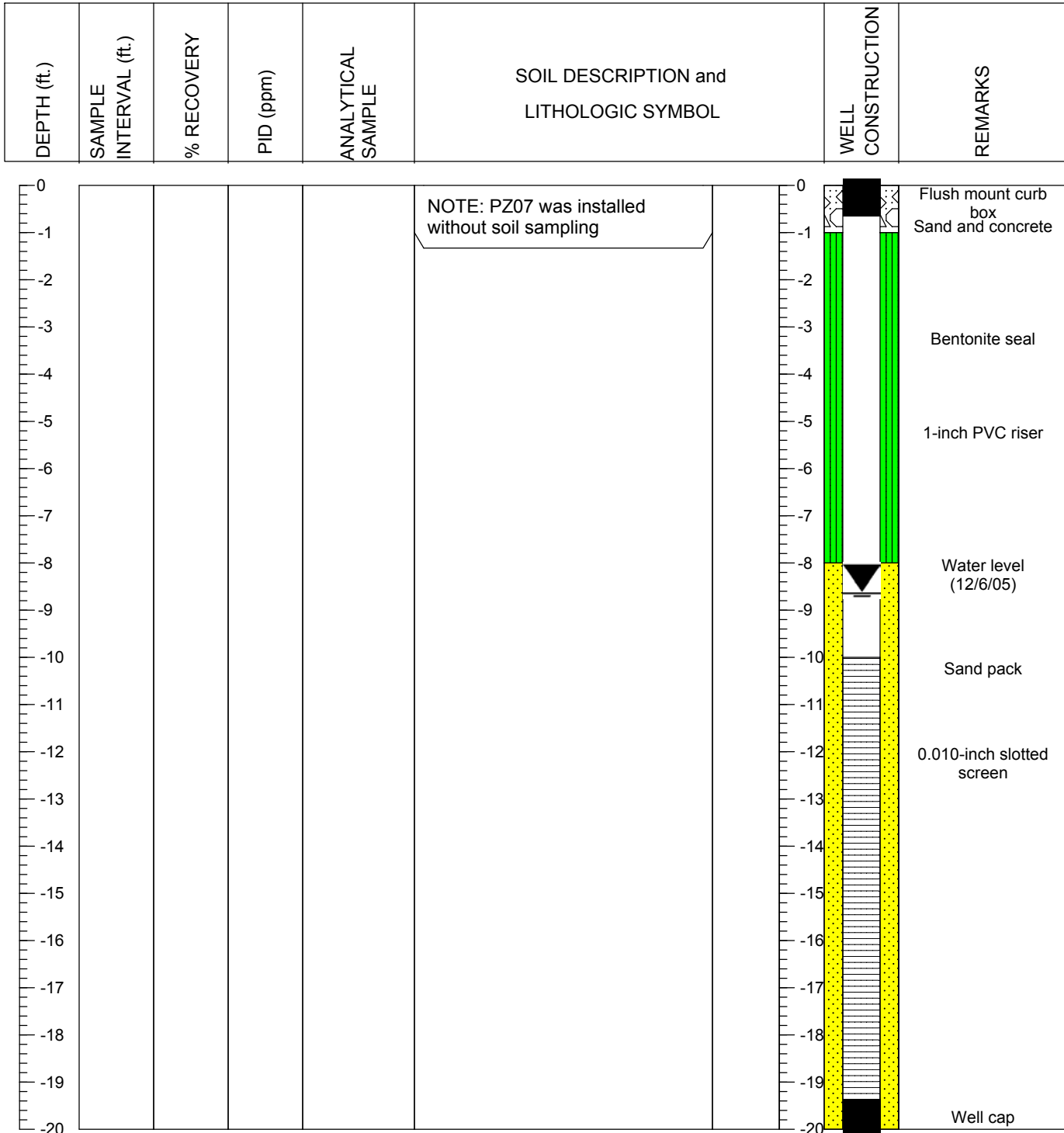
OUTER CASING ELEVATION: NA

DEPTH TO WATER: 8.37 ft. below TOC

BOREHOLE DEPTH: 20 ft. below grade

WEATHER: Not recorded

GEOLOGIST: Pete DeClercq



# NO-PZ08

PROJECT: Norwich - NYSEG

PROJECT NO: I03032

LOCATION: Norwich, NY

DATE: 10/28/2004

DRILLING CONTRACTOR: Lyon Drilling

DRILLER: Harry Lyon

DRILLING METHOD: Trailer-mounted Direct Push Rig

SAMPLING METHOD: 4 ft. Geoprobe macrocores

GROUND ELEVATION: 1001.11 ft. above MSL

WELL ELEVATION: 1000.85 ft. above MSL

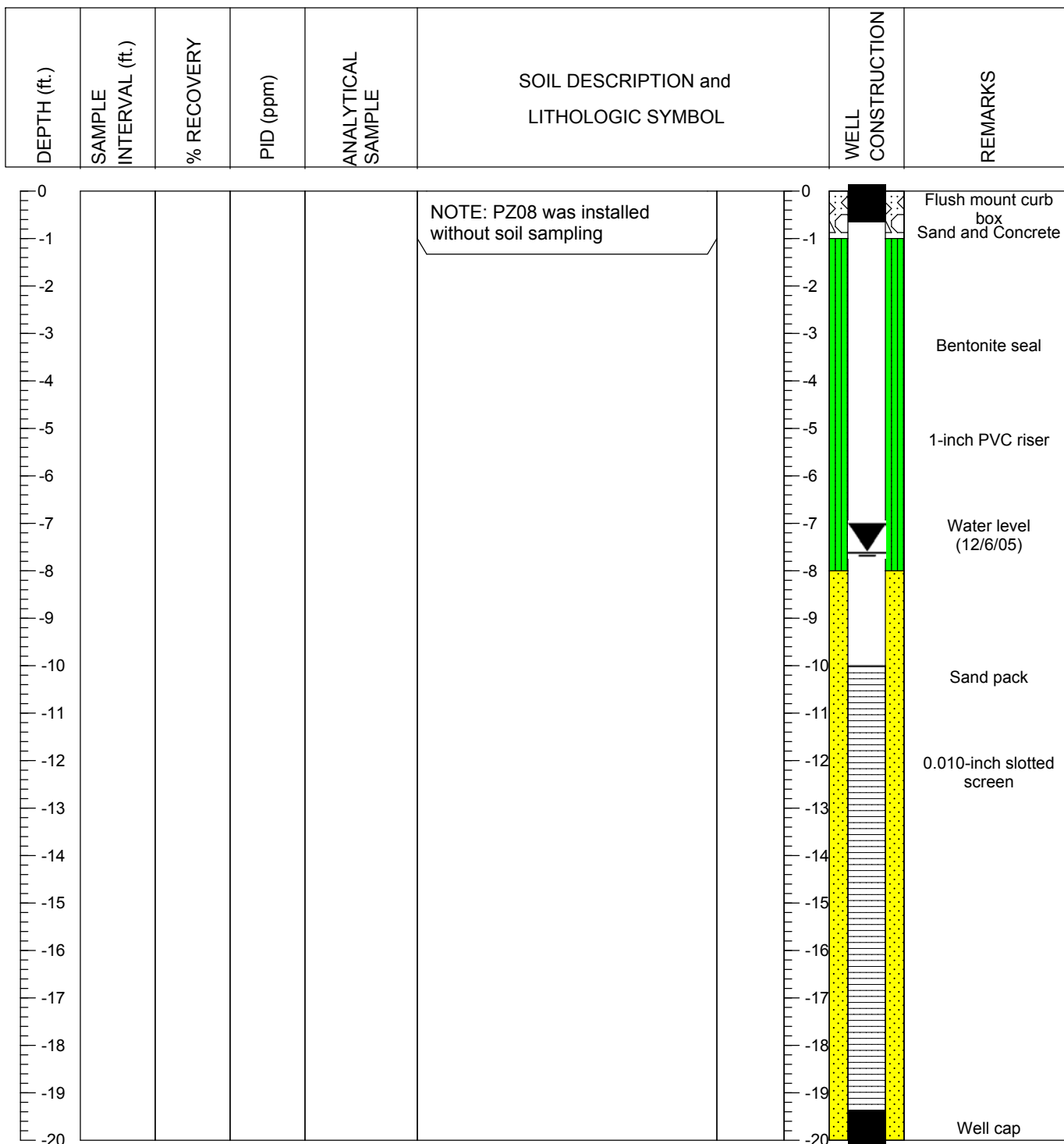
OUTER CASING ELEVATION: NA

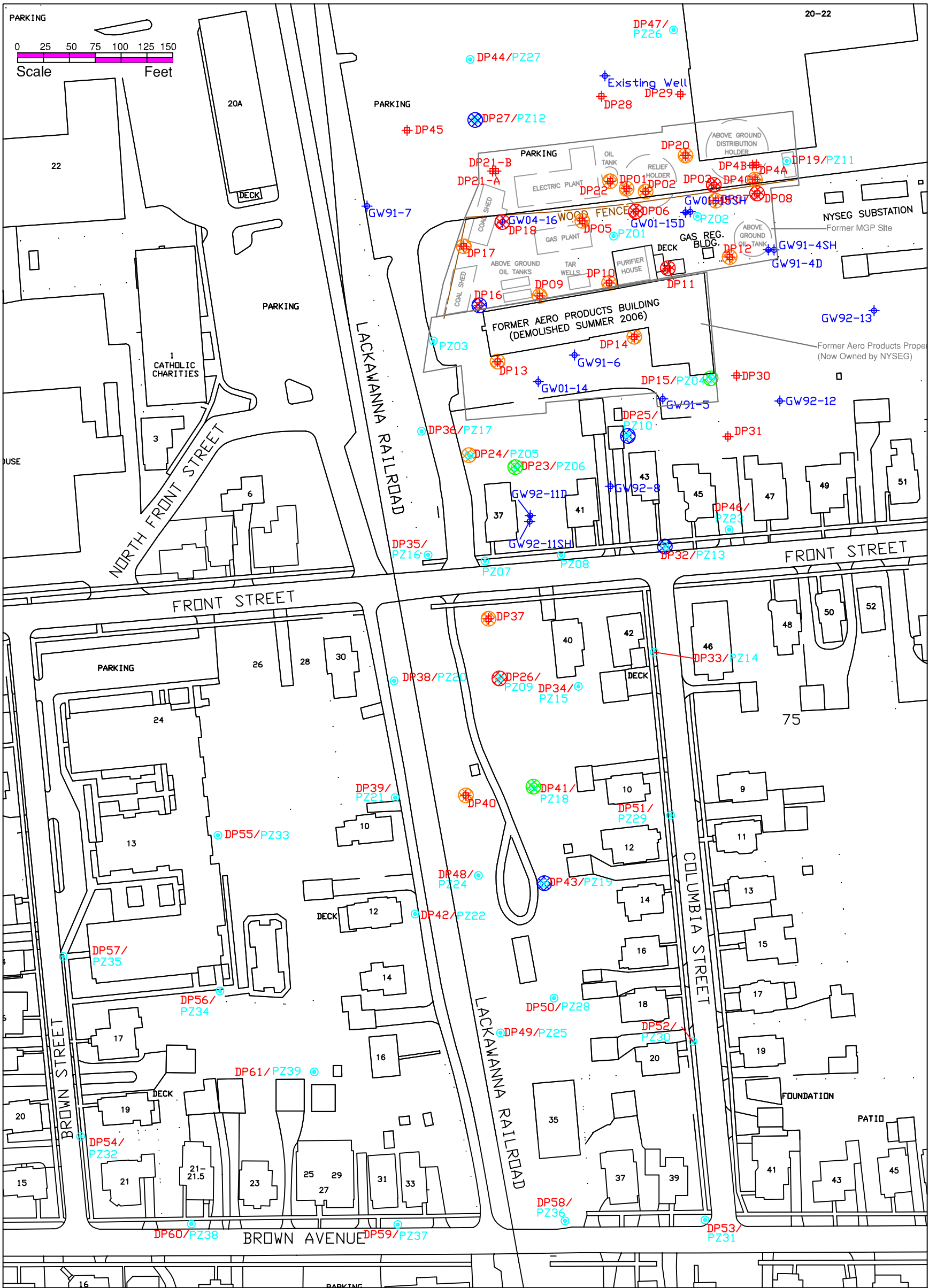
DEPTH TO WATER: 7.35 ft. below TOC

BOREHOLE DEPTH: 20 ft. below grade

WEATHER: Not recorded

GEOLOGIST: Pete DeClercq





LEGEND

- Location of Former Facility Structures
- Site Boundary
- Piezometer
- Monitoring Well Shallow
- Monitoring Well Deep
- Direct Push Sampling Location

NOTES:

- All visual observations were made during the logging of soil borings, except for sheens at DP43/PZ19, which were noted during piezometer development.

Summary of Visual Observations in Soil

- Substantial NAPL
- Moderate NAPL
- Slight NAPL
- Sheens

Note:

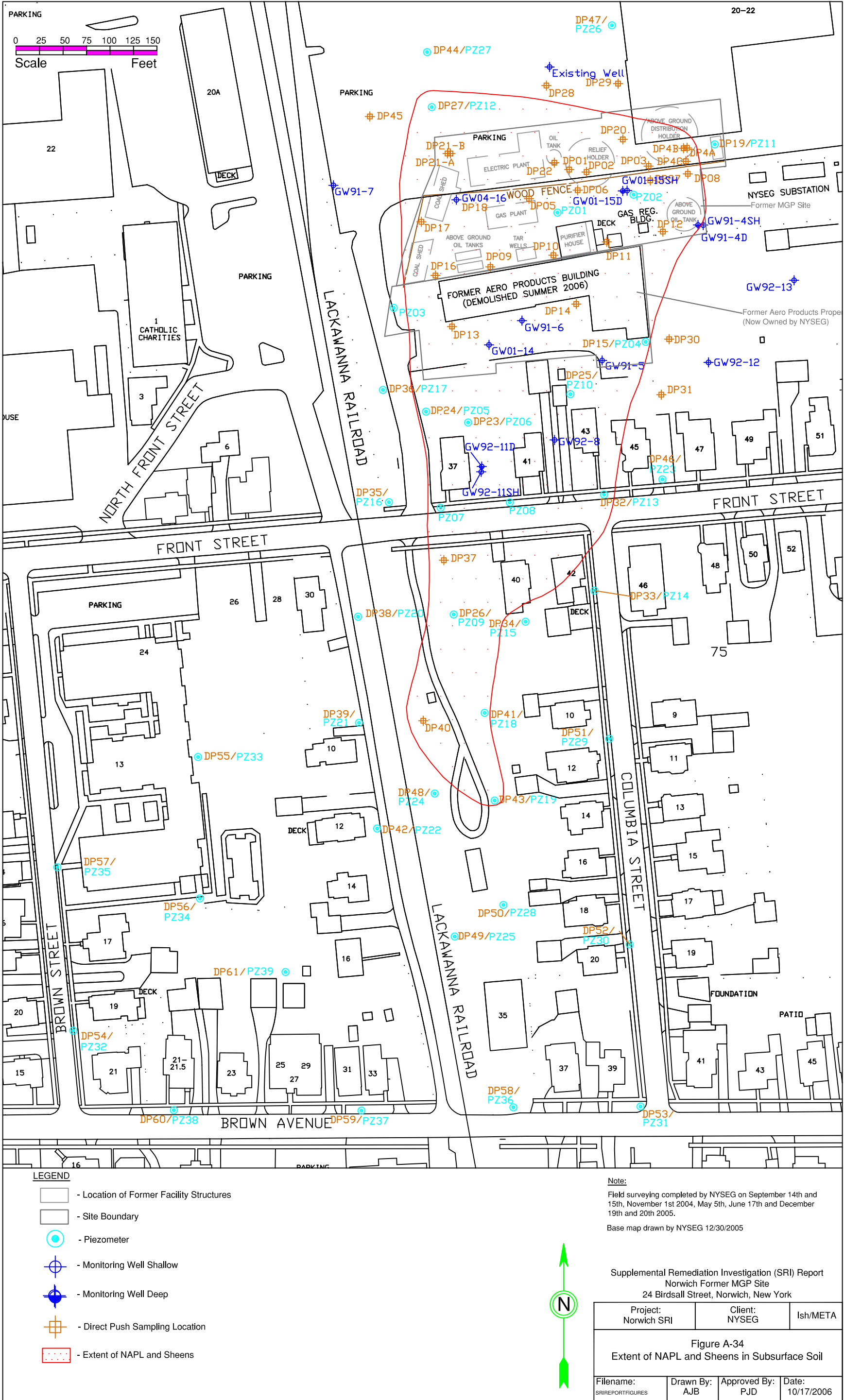
Field surveying completed by NYSEG on September 14th and 15th, November 1st 2004, May 5th, June 17th and December 19th and 20th 2005.

Base map drawn by NYSEG 12/30/2005

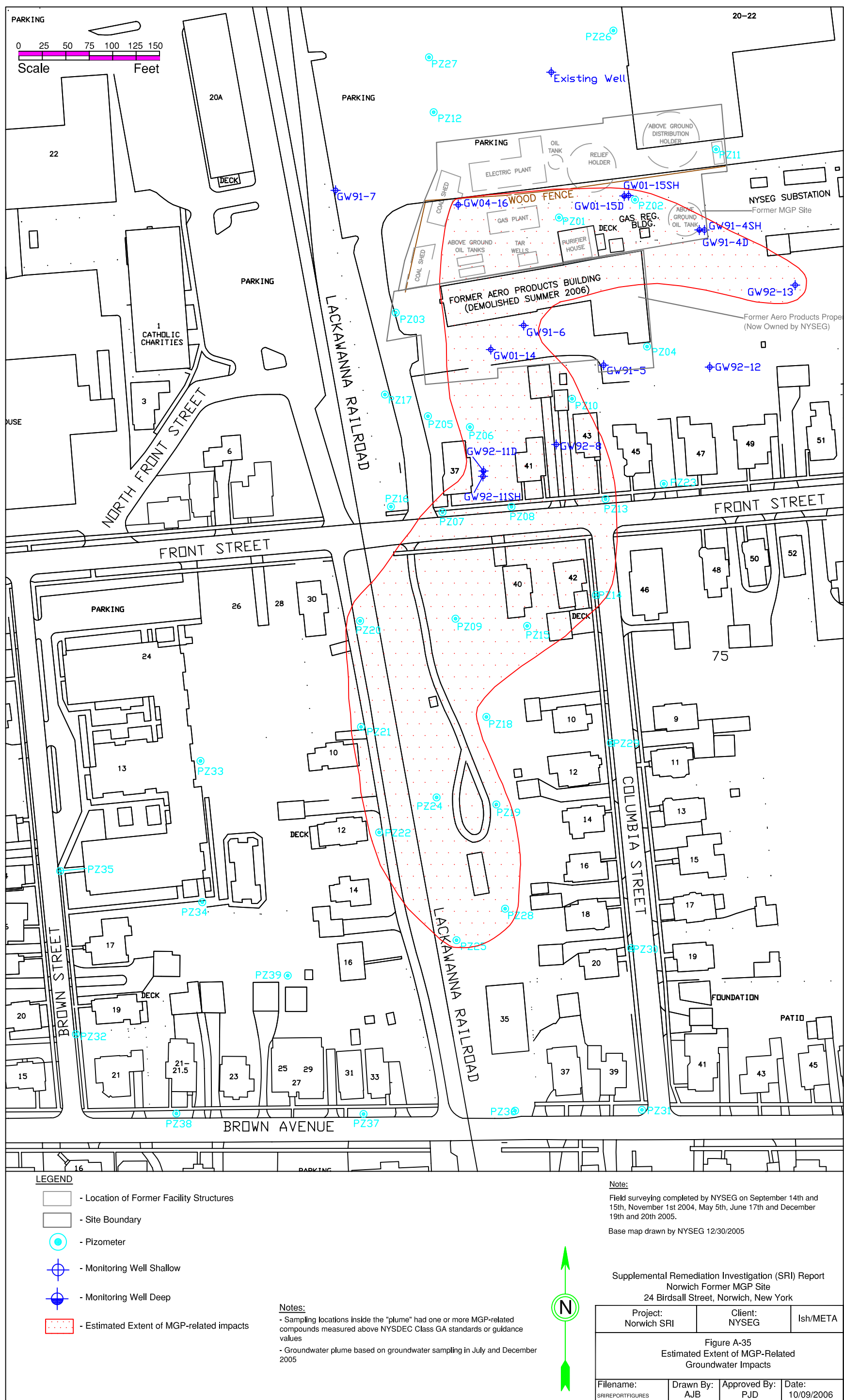
Supplemental Remediation Investigation (SRI) Report  
Norwich Former MGP Site  
24 Birdsall Street, Norwich, New York

Project: Norwich SRI	Client: NYSEG	Ish/META
Figure A-30 Visual Observations of Sheen or NAPL in Subsurface Soil		
Filename: SRIREPORTFIGURES	Drawn By: AJB	Approved By: PJD
Date: 10/09/2006		

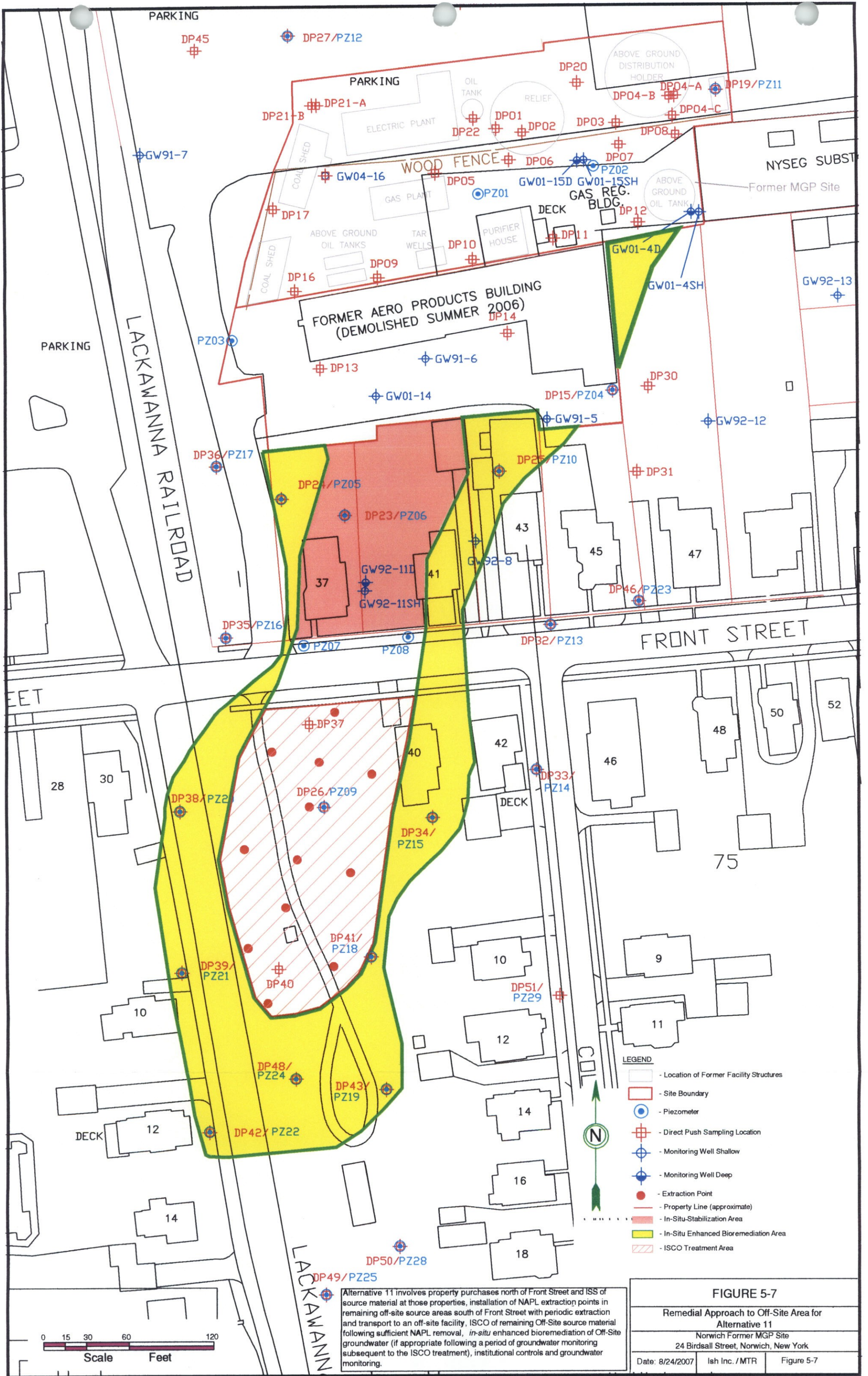




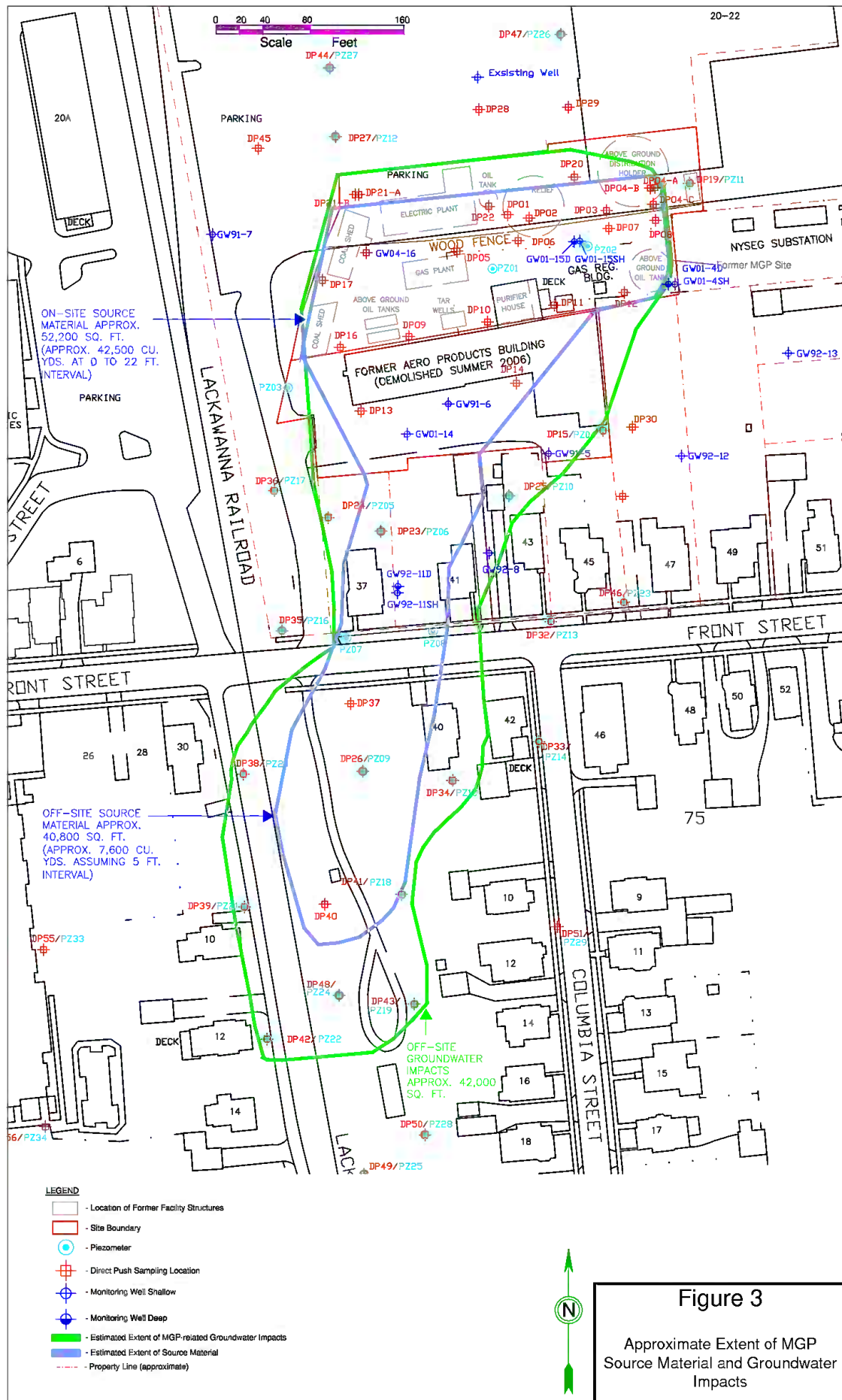


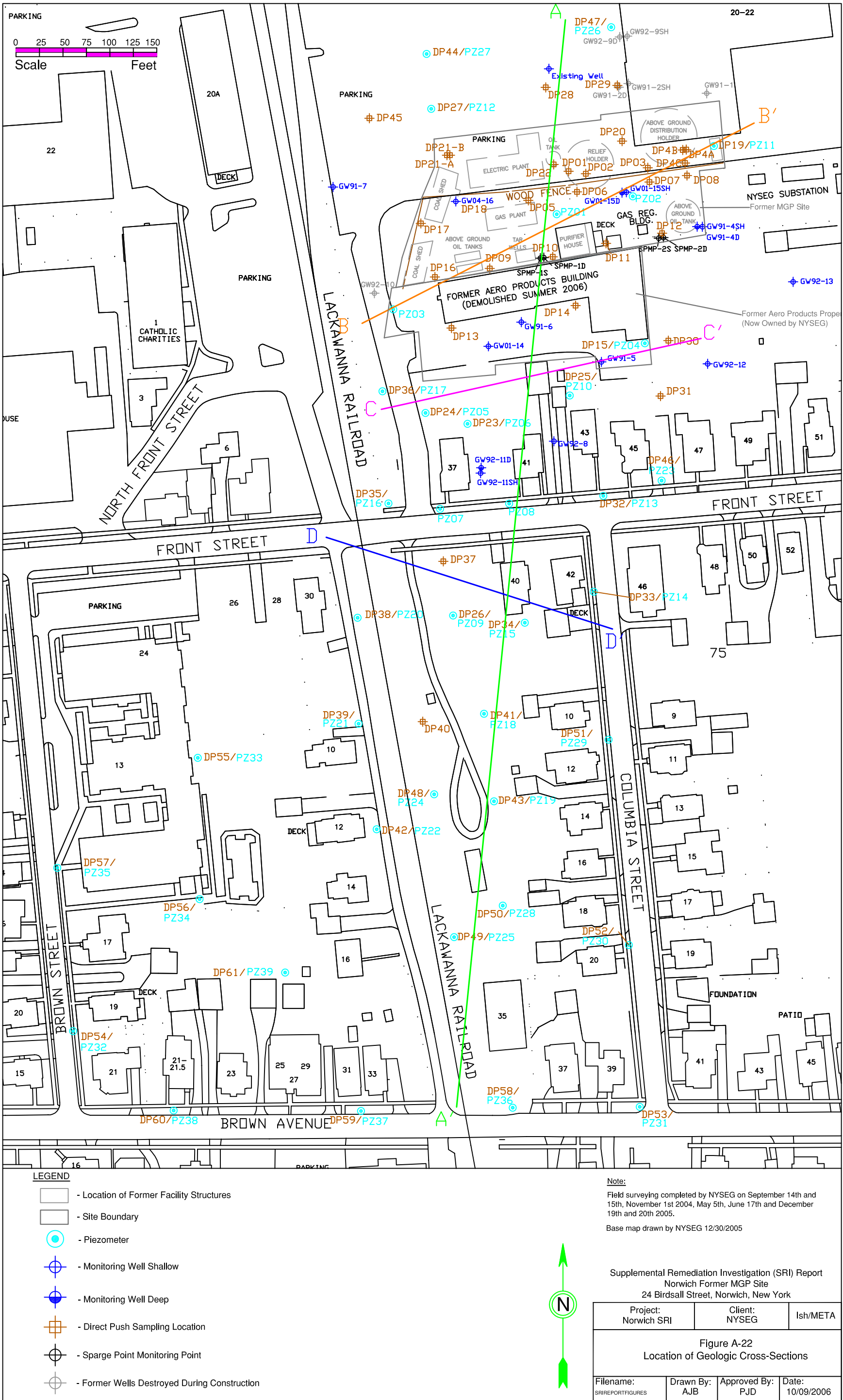




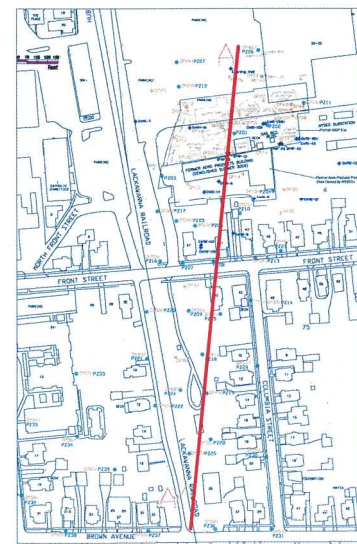
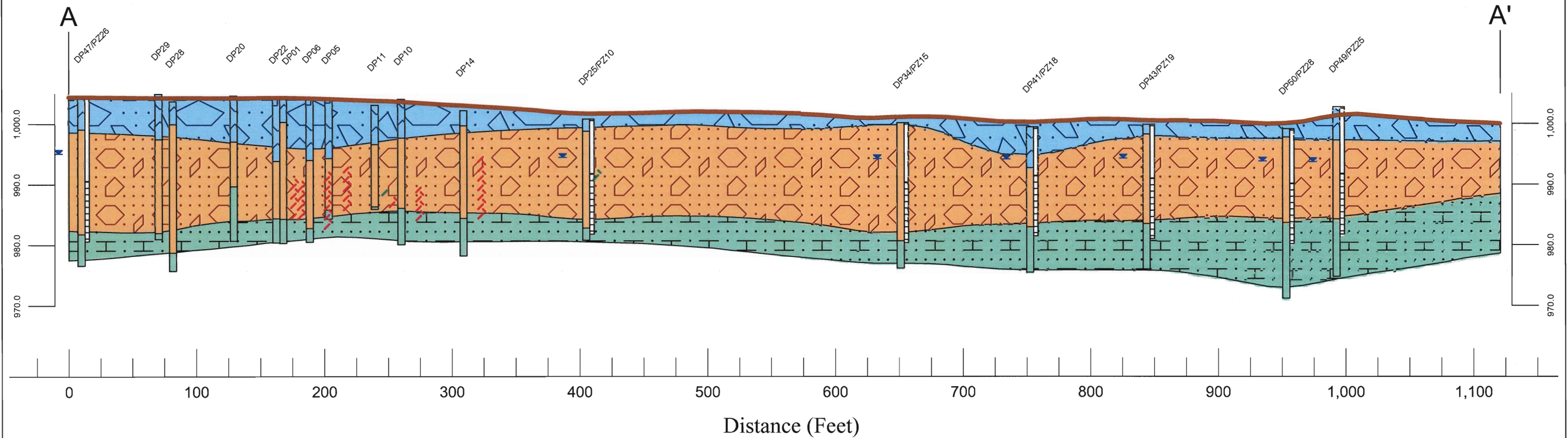








# Cross Section A-A'



Water Level (12/6/2005)



Piezometer/Monitoring Well

## LEGEND



Fill



Alluvial Sediments



Glacial Lacustrine Deposits



NAPL



Sheens



Tar-Like Material

Project:  
Norwich SRI

Client:  
NYSEG

Ish / META

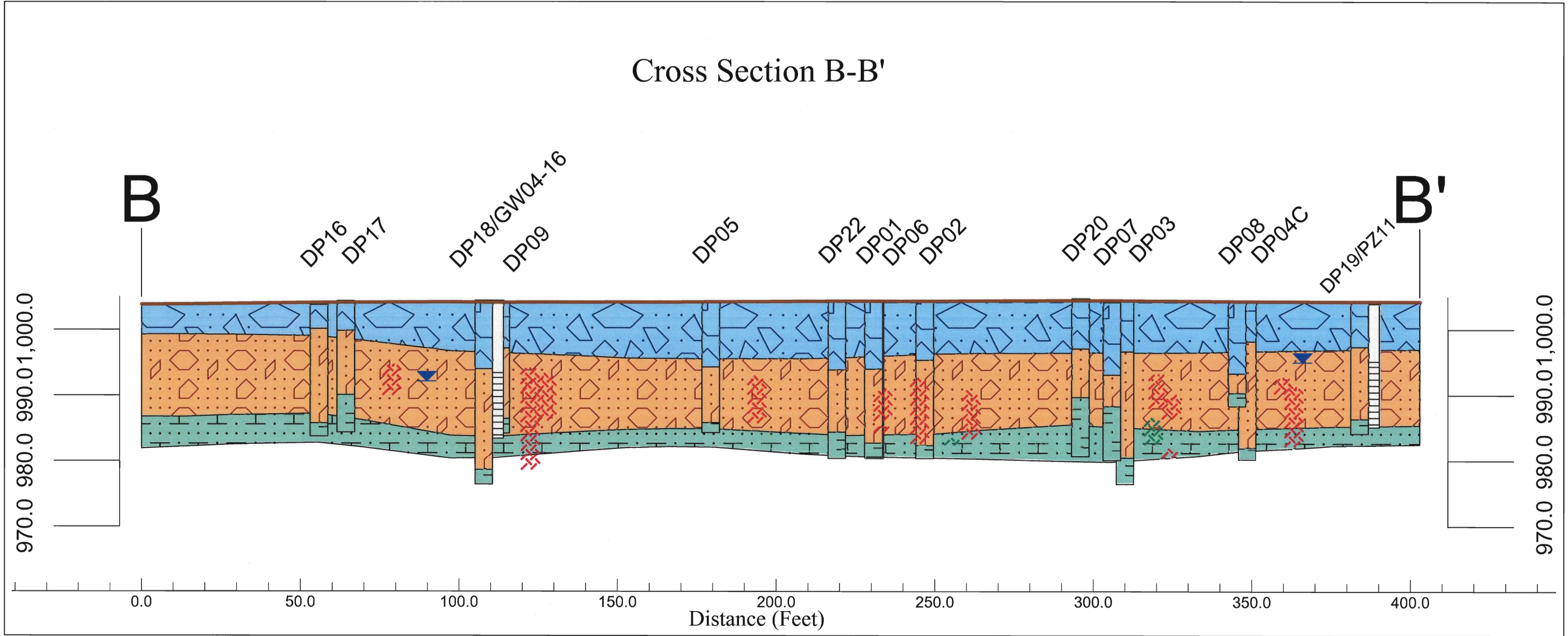
Figure A-23  
Geologic Cross Section A-A'

Drawn by:  
AJB


Approved by:  
PJD

Date:  
10/30/2006











  
 Water Level (12/6/2005)

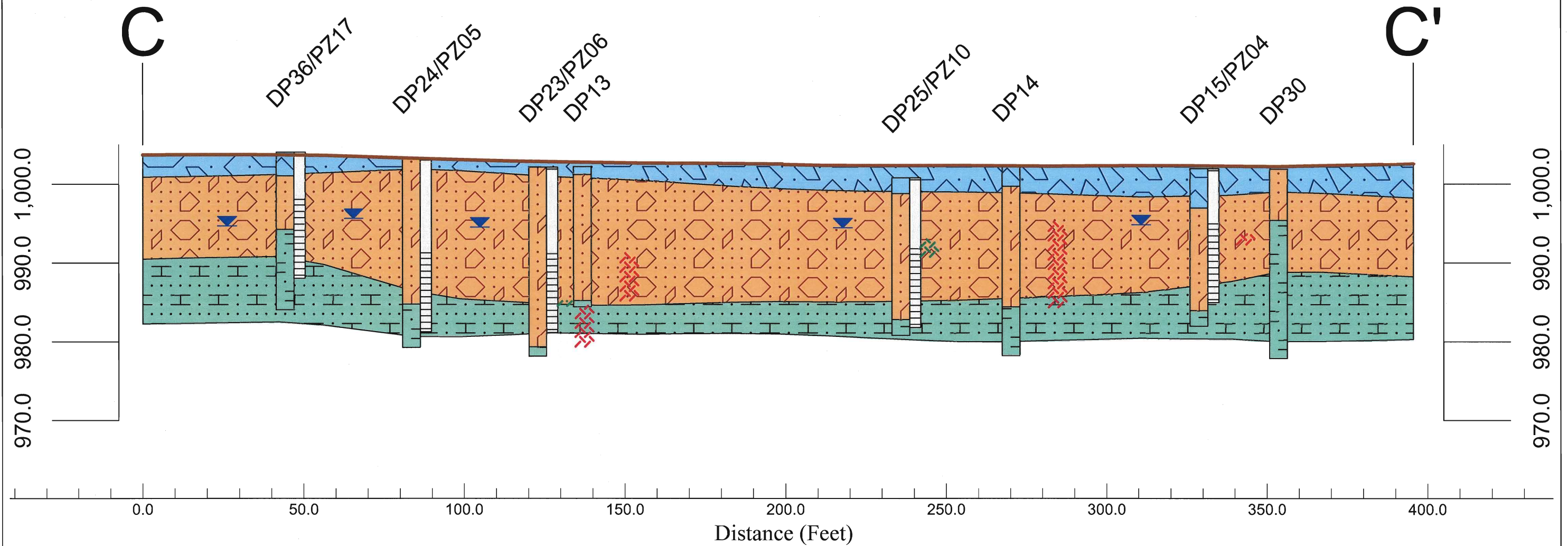
  
 Piezometer/Monitoring Well

#### LEGEND

- |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <div style="display: flex; align-items: center; margin-bottom: 5px;">  <span style="margin-left: 5px;">Fill</span> </div> <div style="display: flex; align-items: center; margin-bottom: 5px;">  <span style="margin-left: 5px;">Alluvial Sediments</span> </div> <div style="display: flex; align-items: center;">  <span style="margin-left: 5px;">Glacial Lacustrine Deposits</span> </div> | <div style="display: flex; align-items: center; margin-bottom: 5px;">  <span style="margin-left: 5px;">NAPL</span> </div> <div style="display: flex; align-items: center; margin-bottom: 5px;">  <span style="margin-left: 5px;">Sheens</span> </div> <div style="display: flex; align-items: center;">  <span style="margin-left: 5px;">Tar-Like Material</span> </div> |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Project: Norwich SRI	Client: NYSEG	Ish / META
<p style="text-align: center;"><b>Figure A-24</b> <b>Geologic Cross Section B-B'</b></p>		
Drawn by: AJB	Approved by: PJD	Date: 10/30/2006

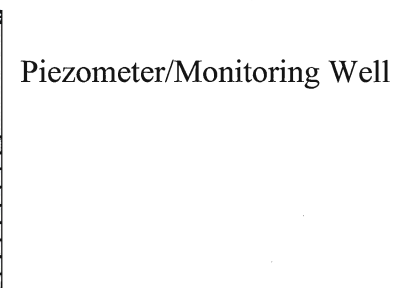
# Cross Section C-C'




## LEGEND



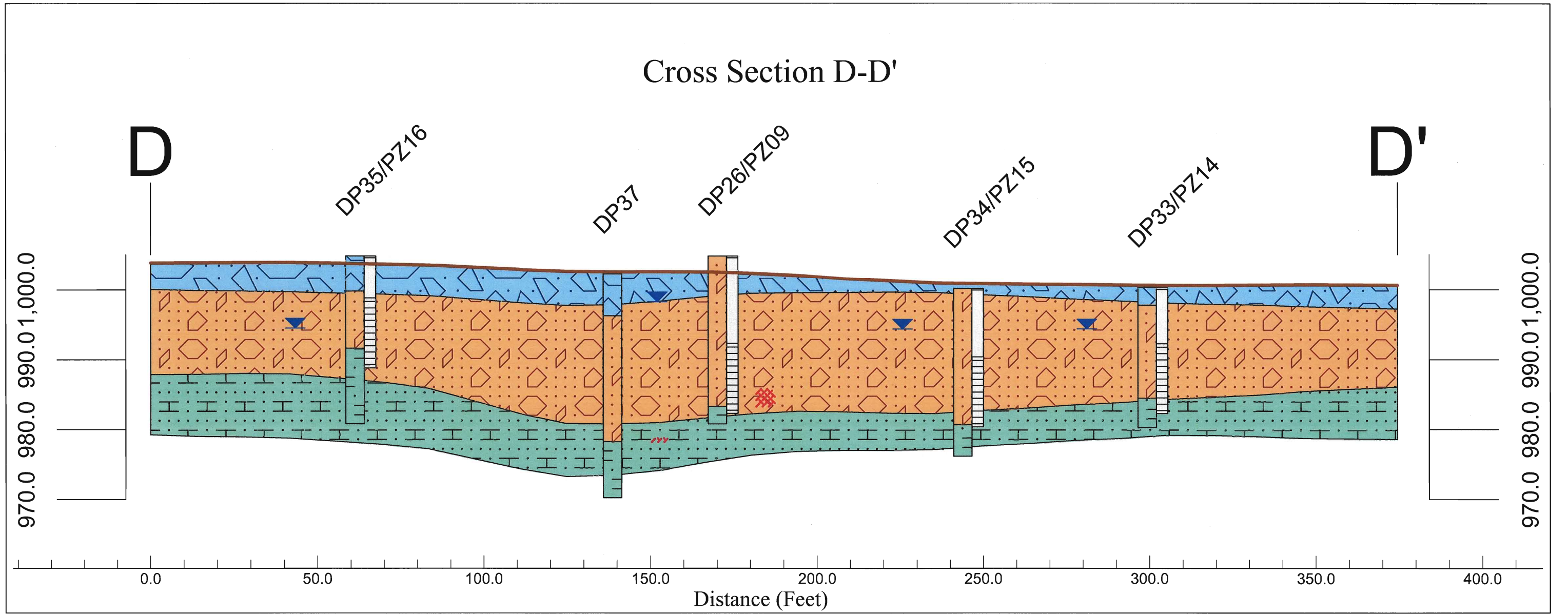
Water Level (12/6/2005)




	Fill		NAPL
	Alluvial Sediments		Sheens
	Glacial Lacustrine Deposits		Tar-Like Material

Project: Norwich SRI	Client: NYSEG	Ish / META
<p>Figure A-25 Geologic Cross Section C-C'</p>		
Drawn by: AJB	Approved by: PJD	Date: 10/30/2006






  
 Water Level (12/6/2005)

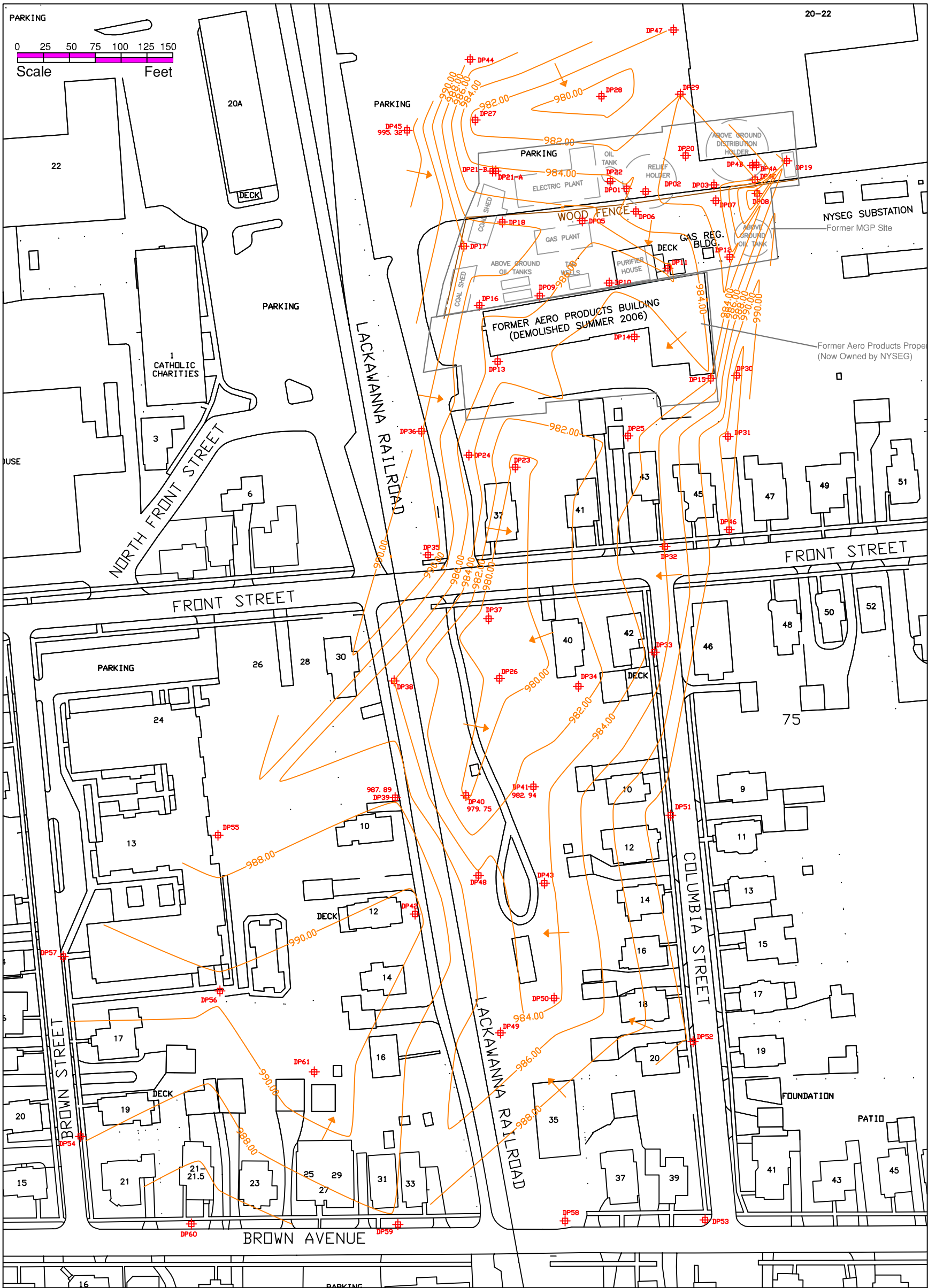
  
 Piezometer/Monitoring Well

#### LEGEND

- |                                                                                                                   |                                                                                                         |
|-------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
|  Fill                        |  NAPL              |
|  Alluvial Sediments          |  Sheens            |
|  Glacial Lacustrine Deposits |  Tar-Like Material |

Project: Norwich SRI	Client: NYSEG	Ish / META
Figure A-26 Geologic Cross Section D-D'		
Drawn by: AJB	Approved by: PJD	Date: 10/30/2006





LEGEND

- Location of Former Facility Structures
- Site Boundary
- Direct Push Sampling Location with Silty Clay Interval Elevation (900.00 feet above MSL)
- Silty Clay Contour Line and Slope Direction

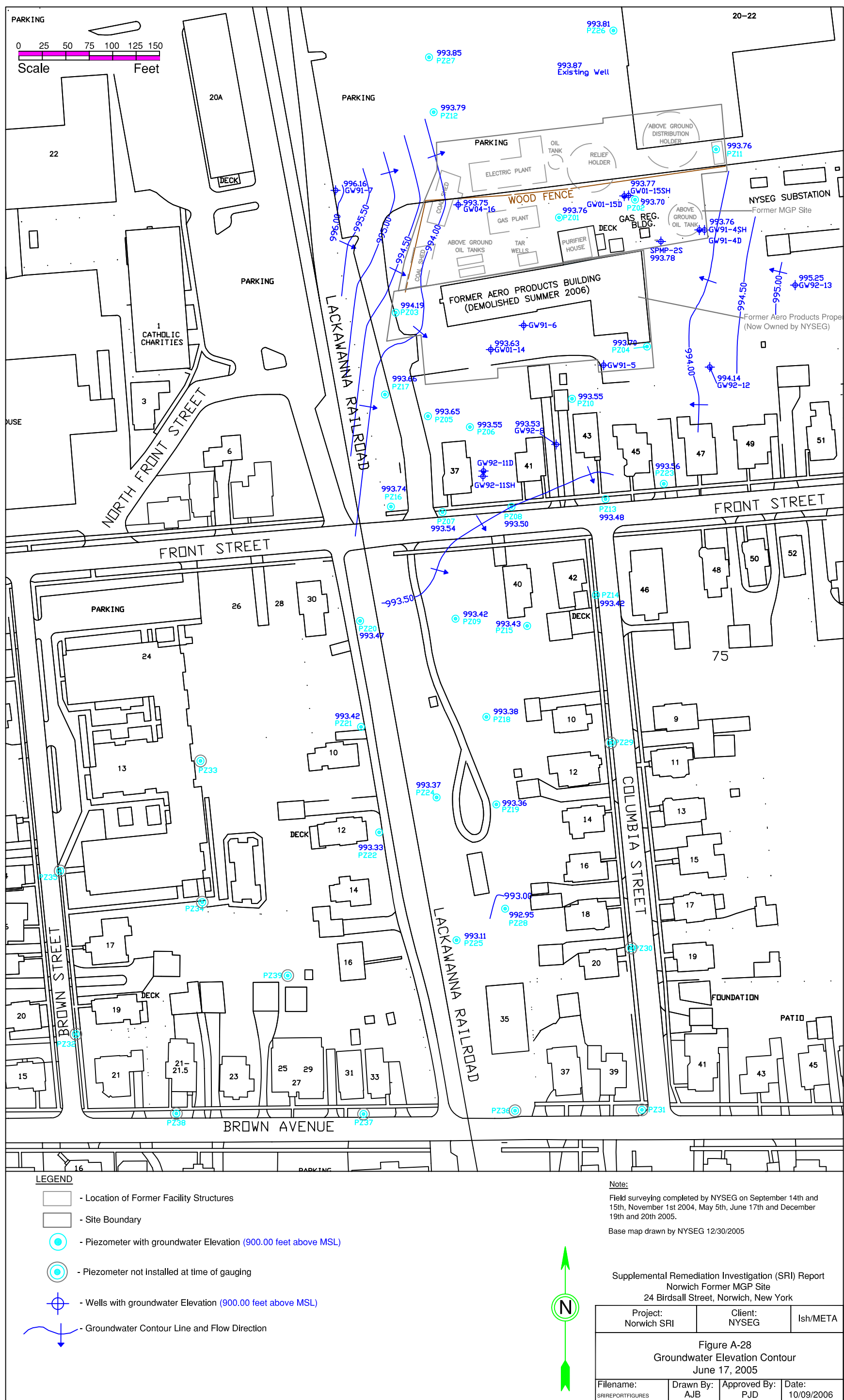
Note:

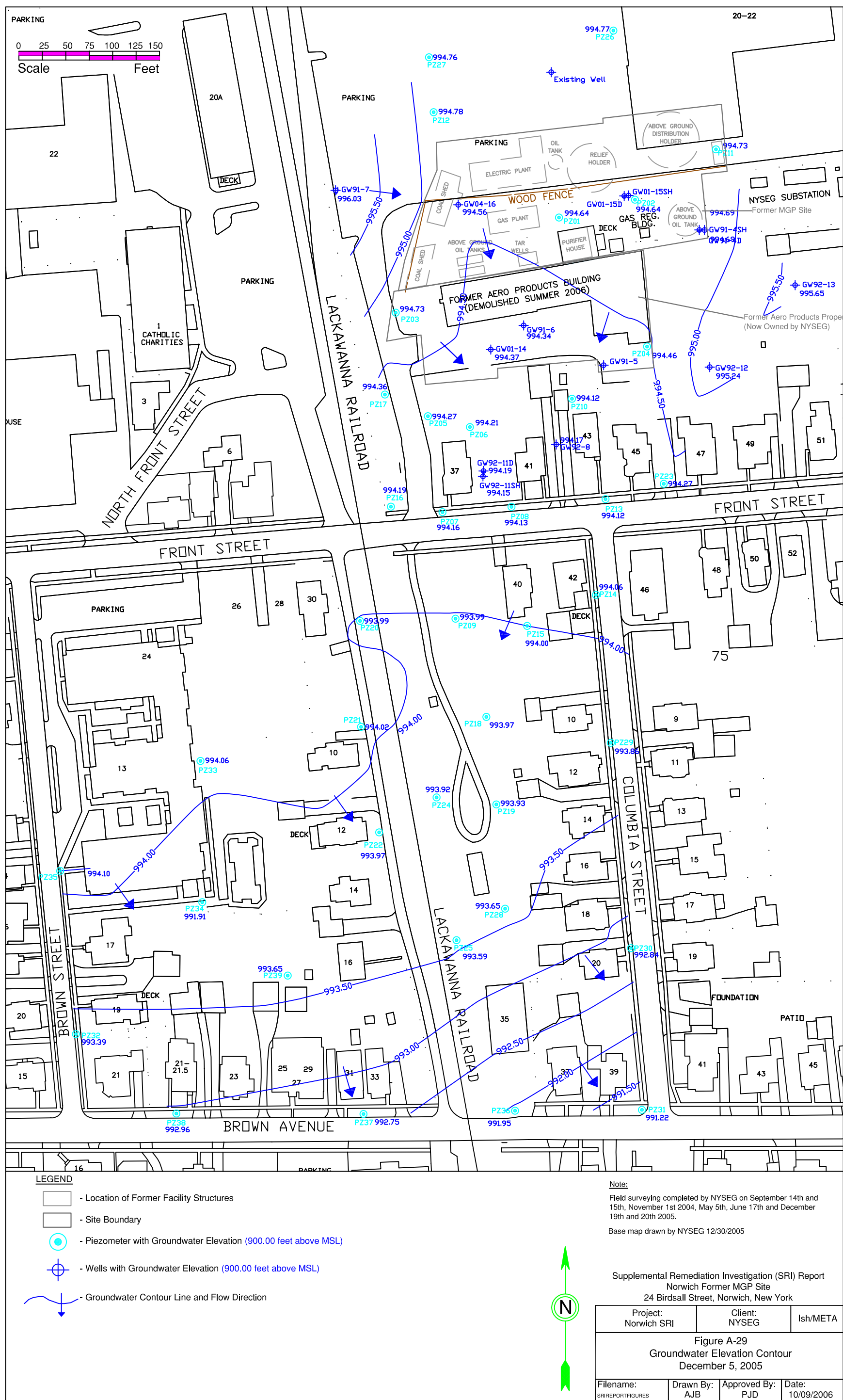
Field surveying completed by NYSEG on September 14th and 15th, November 1st 2004, May 5th, June 17th and December 19th and 20th 2005.

Base map drawn by NYSEG 12/30/2005

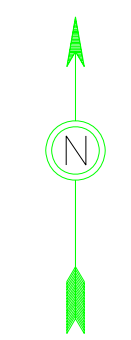
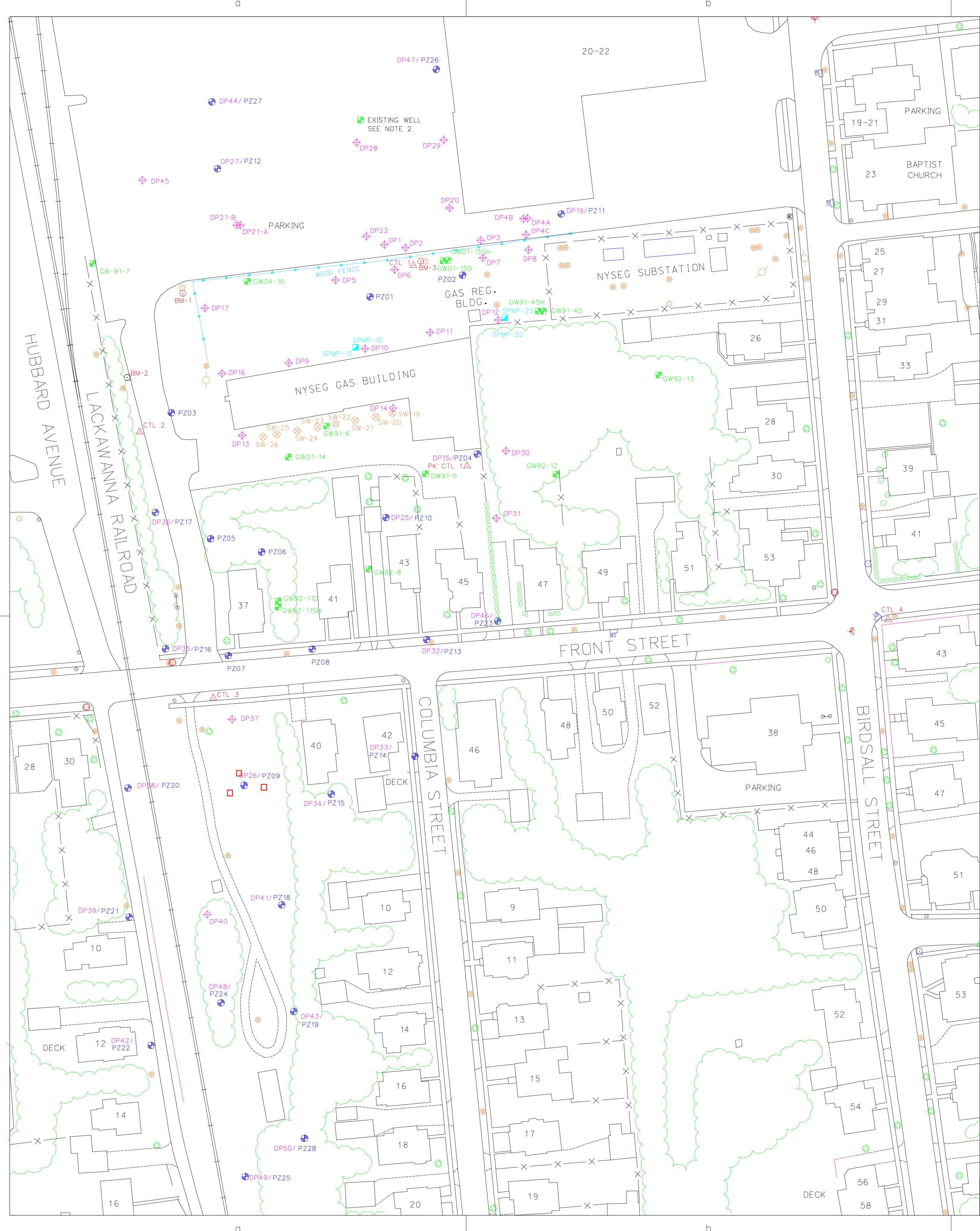
Supplemental Remediation Investigation (SRI) Report  
Norwich Former MGP Site  
24 Birdsall Street, Norwich, New York

Project: Norwich SRI	Client: NYSEG	Ish/META
Figure A-27 Silty Clay Layer Elevation Contour		
Filename: SRIREPORTFIGURES	Drawn By: AJB	Approved By: PJD
Date: 10/17/2006		





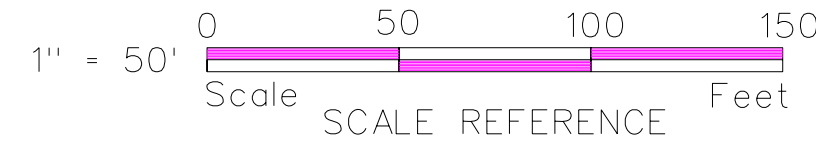




HORIZONTAL DATUM: NAD 83  
STATE PLANE: NEW YORK CENTRAL  
VERTICAL DATUM: NAVD 88

FIELD SURVEY DONE BY NYSEG DATED  
SEPTEMBER 14th & 15th, NOVEMBER 1st 2004,  
MAY 5th, AND JUNE 17th 2005.

- NOTES
1. BM-1 IS A CHISLED SQUARE ON THE SOUTH SIDE OF A CONCRETE LIGHTPOLE BASE.
- BM-2 IS A CHISLED "X" ON THE NORTH CAP NUT OF A HYDRANT.
- BM-3 IS A CHISLED "X" WITH MARKER ON THE WEST SIDE OF AN ALUMINUM LIGHT POLE BASE.
2. THIS EXISTING WELL WAS RESET AND NEW ELEVATION DATA IS AS OF 6-17-05.



CADD DRAWING DO NOT REVISE MANUALLY	SYM	ZONE	REVISION	DATE	BY	CHK	APP	/

DWN BY: SC WESTOVER	06/29/05	DSGN BY:	/ /
CHECKED BY:			/ /
DRAFTING:	/ /	DESIGN:	/ /
ENGRG:			/ /
RELEASE APPROVAL:			/ /
AUTHORIZED BY:			/ /
MATERIAL OR SPEC:			

ENGINEERING SERVICES  
BINGHAMTON, N. Y.

TITLE		NORWICH FORMER MGP SITE	
		CITY OF NORWICH	
		CHENANGO COUNTY, NEW YORK	
SCALE	DWG NO	MGP NOR	
1"=50'			REV 4

NAME	NORTHING	EASTING	LID/GROUND ELEVATION	CASING ELEVATION	STAND PIPE
GW04-16	923503.37	1106729.31	1004.40	1006.85	1006.95
GW01-14	923349.61	1106765.06	1001.46	1001.05	
GW01-15D	923521.37	1106900.55	1004.57	1004.29	
GW01-15SH	923521.86	1106904.98	1004.49	1004.01	
GW91-40	923477.29	1106988.50	1003.84	1005.50	1006.03
GW91-45SH	923477.34	1106983.97	1003.75	1006.40	1006.68
GW91-5	923334.84	1106885.09	1001.29	1000.68	
GW91-6	923376.63	1106798.45	1001.58	1001.31	
GW91-7	923519.14	1106593.69	1005.34	1005.14	
GW92-8	923251.39	1106835.57	1000.72	1000.45	
GW92-11D	923223.44	1106756.20	1001.85	1001.31	
GW92-11SH	923218.05	1106756.02	1001.97	1001.66	
GW92-12	923334.51	1106999.63	999.82	999.09	
GW92-13	923421.46	1107089.62	1002.27	1001.86	
EXIST WELL	923644.75	1106828.34	1003.75	1003.48	* NOTE 2
SW-19	923387.92	1106856.15	1002.20	1001.57	
SW-20	923384.69	1106841.63	1001.83	1001.63	
SW-21	923381.56	1106823.69	1001.52	1001.23	
SW-22	923378.76	1106806.62	1001.64	1001.34	
SW-23	923375.67	1106790.75	1001.70	1001.45	
SW-24	923372.39	1106772.88	1001.65	1001.61	
SW-25	923369.43	1106754.92	1001.88	1001.66	
SW-26	923367.14	1106742.80	1001.87	1001.67	
SPMP-1D	923445.76	1106823.90	1004.12	1007.12	
SPMP-1S	923445.54	1106824.02	1004.12	1007.08	
SPMP-2D	923471.47	1106954.64	1003.10	1005.66	
SPMP-2S	923471.64	1106954.74	1003.10	1005.67	
PZ 01	923489.77	1106836.63	1004.30	1003.74	
PZ 02	923508.81	1106917.70	1004.18	1003.91	
PZ 03	923388.34	1106662.49	1003.63	1003.35	
PZ 04	923352.20	1106930.54	1001.94	1001.55	
PZ 05	923277.95	1106696.92	1003.24	1002.86	
PZ 06	923266.35	1106741.61	1002.13	1001.82	
PZ 07	923175.64	1106712.38	1002.19	1001.91	
PZ 08	923181.26	1106785.97	1001.11	1000.85	
PZ 09	923062.02	1106726.23	1000.79	1000.49	
PZ 10	923296.52	1106850.50	1000.78	1000.51	
PZ 11	923562.47	1107004.08	1004.13	1003.86	
PZ 12	923602.09	1106702.92	1003.82	1003.45	
PZ 13	923189.55	1106886.28	1000.88	1000.52	
PZ 14	923087.40	1106876.05	1000.26	999.96	
PZ 15	923054.33	1106802.66	1000.17	999.81	
PZ 16	923181.50	1106657.38	1004.81	1004.49	
PZ 17	923301.02	1106648.48	1004.04	1003.68	
PZ 18	922957.29	1106759.17	999.44	999.15	
PZ 19	922863.99	1106769.80	999.99	999.51	
PZ 20	923059.64	1106624.50	1003.97	1003.64	
PZ 21	922946.68	1106625.50	1001.69	1001.25	
PZ 22	922834.19	1106644.79	1000.88	1000.55	
PZ 23	923205.85	1106948.38	1001.56	1001.21	
PZ 24	922871.45	1106706.07	1003.60	1003.27	
PZ 25	922719.23	1106727.31	1002.78	1002.43	
PZ 26	923689.10	1106894.64	1004.61	1004.18	
PZ 27	923660.61	1106698.00	1003.78	1003.37	
PZ 28	922752.81	1106779.16	999.17	998.79	

NAME	NORTHING	EASTING	ELEVATION
CTL 1	923517.30	1106874.45	1004.44
CTL 2	923371.46	1106634.73	1004.22
CTL 3	923138.47	1106699.24	1002.66
CTL 4	923207.03	1107290.62	1009.85
PK CTL 1	923342.59	1106921.69	1001.88
BM-1	923493.05	1106672.57	1006.89
BM-2	923419.18	1106623.71	1005.765
BM-3	923521.11	1106881.05	1007.775
DP 1	923535.59	1106849.28	1004.28
DP 2	923532.91	1106867.64	1004.35
DP 3	923539.29	1106933.59	1004.44
DP 4A	923558.65	1106974.58	1004.16
DP 4B	923558.24	1106970.88	1004.21
DP 4C	923544.36	1106973.29	1004.19
DP 5	923504.56	1106806.40	1004.30
DP 6	923513.61	1106858.23	1004.48
DP 7	923524.08	1106935.50	1004.08
DP 8	923531.04	1106975.40	1004.29
DP 9	923431.95	1106765.30	1004.18
DP 10	923444.38	1106832.34	1004.07
DP 11	923458.69	1106889.18	1003.10
DP 12	923469.55	1106948.90	1003.34
DP 13	923368.45	1106724.52	1002.20
DP 14	923392.43	1106856.71	1002.19
DP 15	923352.20	1106930.54	1001.94
DP 16	923422.83	1106706.88	1003.73
DP 17	923479.96	1106691.90	1004.34
DP 19	923562.47	1107004.08	1004.13
DP 20	923567.70	1106906.27	1004.67
DP 21-A	923552.69	1106722.90	1004.13
DP 21-B	923552.68	1106719.73	1004.12
DP 22	923542.84	1106833.34	1004.36
DP 25	923296.52	1106850.50	1000.78
DP 26	923062.02	1106726.23	1000.79
DP 27	923602.09	1106702.92	1003.82
DP 28	923624.98	1106824.88	1003.73
DP 29	923627.23	1106901.23	1004.96
DP 30	923355.00	1106955.58	1001.87
DP 31	923295.96	1106947.23	1001.30
DP 32	923189.55	1106886.28	1000.88
DP 33	923087.40	1106876.05	1000.26
DP 34	923054.33	1106802.66	1000.17
DP 35	923181.50	1106657.38	1004.81
DP 36	923301.02	1106648.48	1004.04
DP 37	923119.77	1106715.80	1002.25
DP 38	923059.64	1106624.50	1003.97
DP 39	922946.68	1106625.50	1001.69
DP 40	922948.88	1106693.93	1004.25
DP 41	922957.29	1106759.17	999.44
DP 42	922834.19	1106644.79	1000.88
DP 43	922863.99	1106769.80	999.99
DP 44	923660.61	1106698.00	1003.78
DP 45	923592.07	1106637.10	1004.52
DP 46	923205.85	1106948.38	1001.56
DP 47	923689.10	1106894.64	1004.61
DP 48	922871.45	1106706.07	1003.60
DP 49	922719.23	1106727.31	1002.78
DP 50	922752.81	1106779.16	999.17

- LEGEND
- △ - CONTROL POINT
  - ⊕ - BENCHMARK
  - ⊕ - GROUND WATER WELL
  - ⊕ - SPARGE POINT MONITORING POINT
  - ⊕ - SPARGE WELL
  - ⊕ - PIEZOMETER
  - ⊕ - DIRECT PUSH
  - ⊕ - UTILITY POLE W/GUY
  - ⊕ - POWER POLE
  - ⊕ - LIGHT POLE
  - ⊕ - TRAFFIC LIGHT
  - ⊕ - FIRE HYDRANT
  - ⊕ - MANHOLE
  - ⊕ - CATCH BASIN
  - ⊕ - POST, SIGN

**Project Name:** Norwich MGP Site

**NYSEG/Project Number:** NYSEG/04964-031

**Date Started/Date Completed:** 8/3/09

**Boring Location:** 7 ft north of well PZ09

**Drilling Company:** Paragon Environmental Construction, Inc.

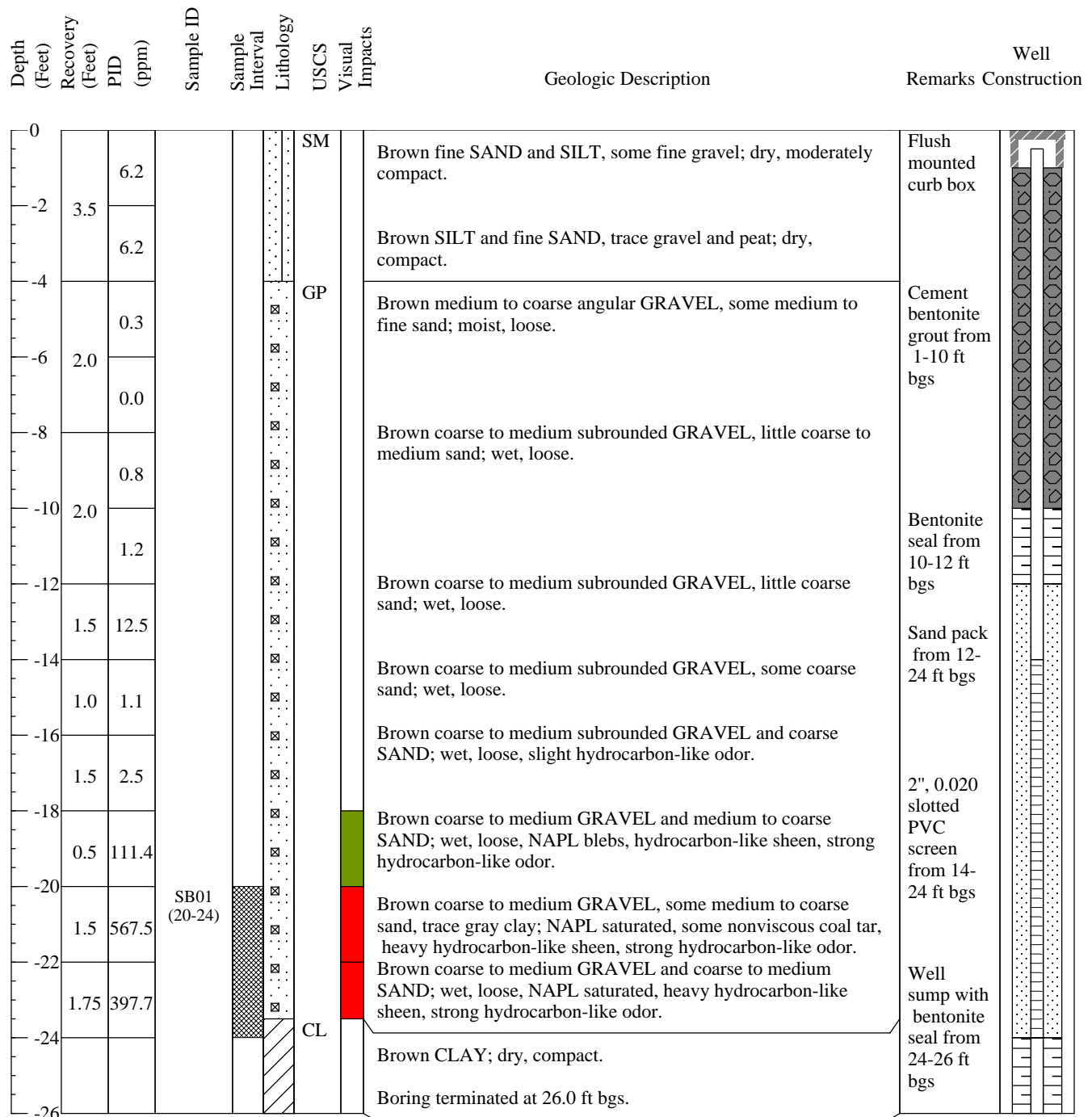
**Sampling Method:** Split spoon, macro-core

**PVC Elevation (ft/msl, NAVD 88):** NA

**Ground Elevation (ft/msl, NAVD 88):** NA

**Total Depth:** 26.0 ft bgs

**Logged By:** H. Jones



Coal Tar or Coal Tar NAPL Saturated Soil



Hydrocarbon Staining, Hydrocarbon Sheen or NAPL Blebs

Comments: Soil from 20 to 24 ft bgs was used in heavily impacted composite. Sample SB01(20-24) was sent to XDD.



**Project Name:** Norwich MGP Site

**NYSEG/Project Number:** NYSEG/04964-031

**Date Started/Date Completed:** 8/3/09

**Boring Location:** 16 ft west of well PZ09

**Drilling Company:** Paragon Environmental Construction, Inc.

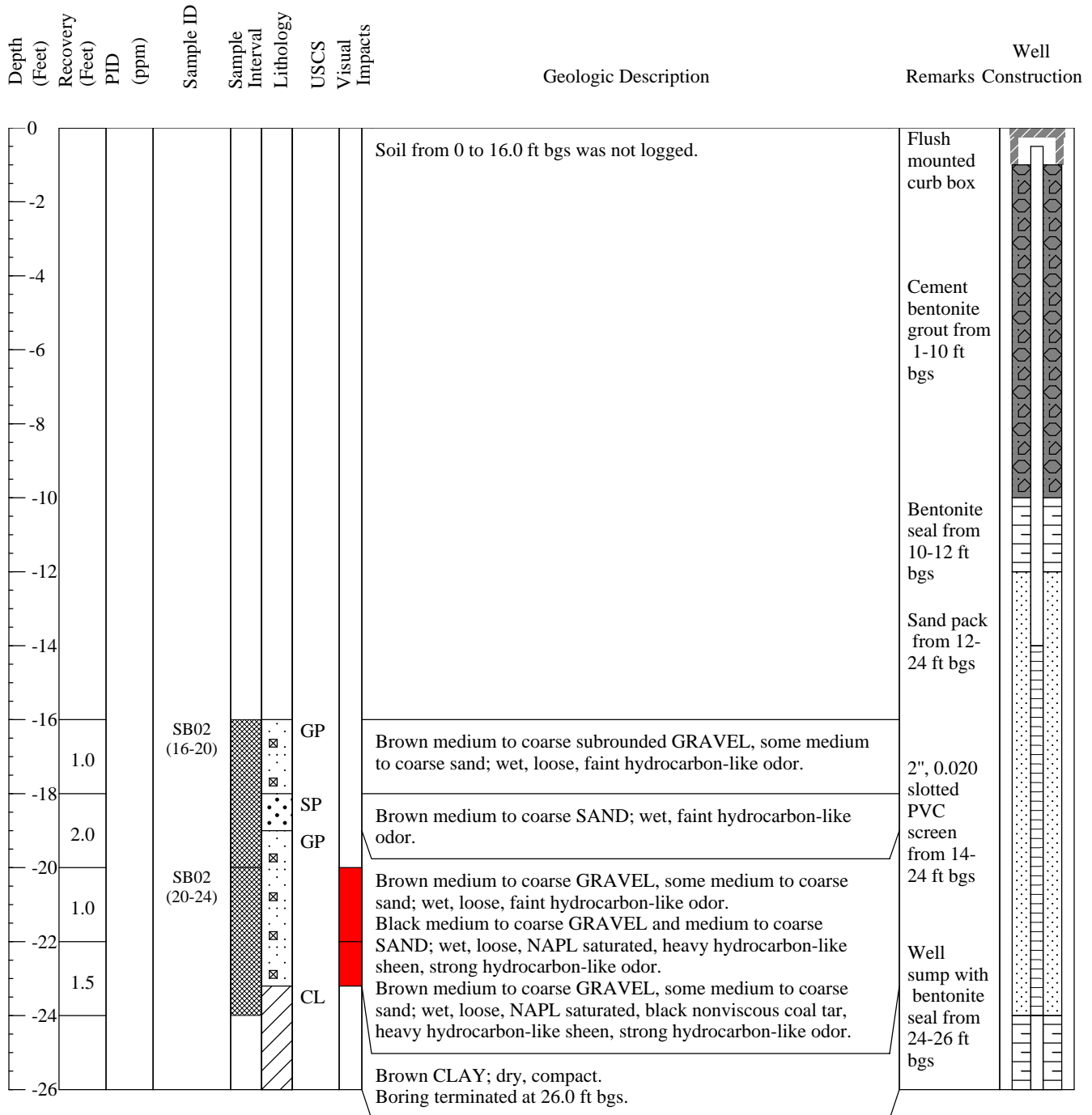
**Sampling Method:** Split spoon, macro-core

**PVC Elevation (ft/msl, NAVD 88):** NA

**Ground Elevation (ft/msl, NAVD 88):** NA

**Total Depth:** 26.0 ft bgs

**Logged By:** H. Jones



Coal Tar or Coal Tar NAPL Saturated Soil



Hydrocarbon Staining, Hydrocarbon Sheen or NAPL Blebs

Comments: Soil from 20 to 24 ft bgs was used in heavily impacted composite. Samples SB02(16-20) and SB02(20-24) sent to XDD.

**Project Name:** Norwich MGP Site

**NYSEG/Project Number:** NYSEG/04964-031

**Date Started/Date Completed:** 8/4/09

**Boring Location:** 22 ft north of well PZ09

**Drilling Company:** Paragon Environmental Construction, Inc.

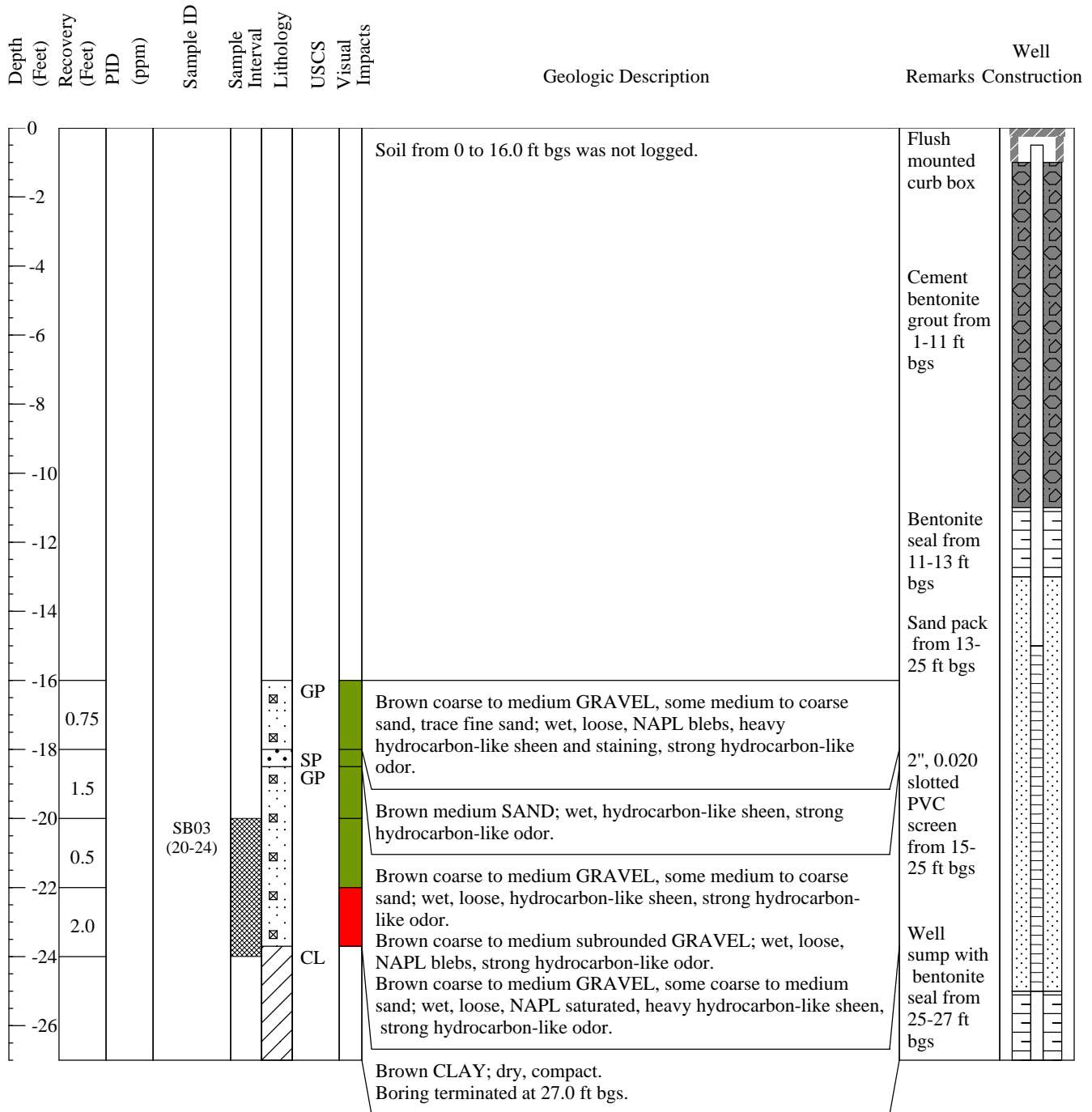
**Sampling Method:** Split spoon, macro-core

**PVC Elevation (ft/msl, NAVD 88):** NA

**Ground Elevation (ft/msl, NAVD 88):** NA

**Total Depth:** 27.0 ft bgs

**Logged By:** H. Jones



Coal Tar or Coal Tar NAPL Saturated Soil



Hydrocarbon Staining, Hydrocarbon Sheen or NAPL Blebs

Comments: Soil from 20 to 24 ft bgs was used in heavily impacted composite. Samples SB03(20-24) sent to XDD.

**Project Name:** Norwich MGP Site

**NYSEG/Project Number:** NYSEG/04964-031

**Date Started/Date Completed:** 8/4/09

**Boring Location:** 8 ft south of well PZ09

**Drilling Company:** Paragon Environmental Construction, Inc.

**Sampling Method:** Split spoon, macro-core

**Ground Elevation (ft/msl, NAVD 88):** NA

**Total Depth:** 22.0 ft bgs

**Logged By:** H. Jones

Depth (Feet)	Recovery (Feet)	PID (ppm)	Sample ID	Sample Interval	Lithology	USCS	Visual Impacts	Geologic Description	Remarks
0								Soil from 0 to 16.0 ft bgs was not logged.	
-2									
-4									
-6									
-8									
-10									
-12									
-14									
-16	0.5					GP		Brown coarse to medium GRAVEL, some medium to coarse sand; wet, loose, trace hydrocarbon-like sheen, moderate hydrocarbon-like odor.	
-18	1.5					SP		Brown medium SAND; wet, moderate hydrocarbon-like sheen, moderate hydrocarbon-like odor.	
-20	1.5					GP		Brown medium to coarse GRAVEL; wet, loose, moderate hydrocarbon-like sheen, moderate hydrocarbon-like odor.	
-22						CL		Brown medium SAND; wet, trace hydrocarbon-like sheen, moderate hydrocarbon-like odor.	
								Brown coarse GRAVEL; wet, loose, trace hydrocarbon-like sheen, moderate hydrocarbon-like odor.	
								Brown CLAY; dry, compact. Boring terminated at 22.0 ft bgs.	



Coal Tar or Coal Tar NAPL Saturated Soil



Hydrocarbon Staining, Hydrocarbon Sheen or NAPL Blebs

Comments: No samples were collected.



**Project Name:** Norwich MGP Site

**NYSEG/Project Number:** NYSEG/04964-031

**Date Started/Date Completed:** 8/4/09

**Boring Location:** 59 ft south of well PZ09

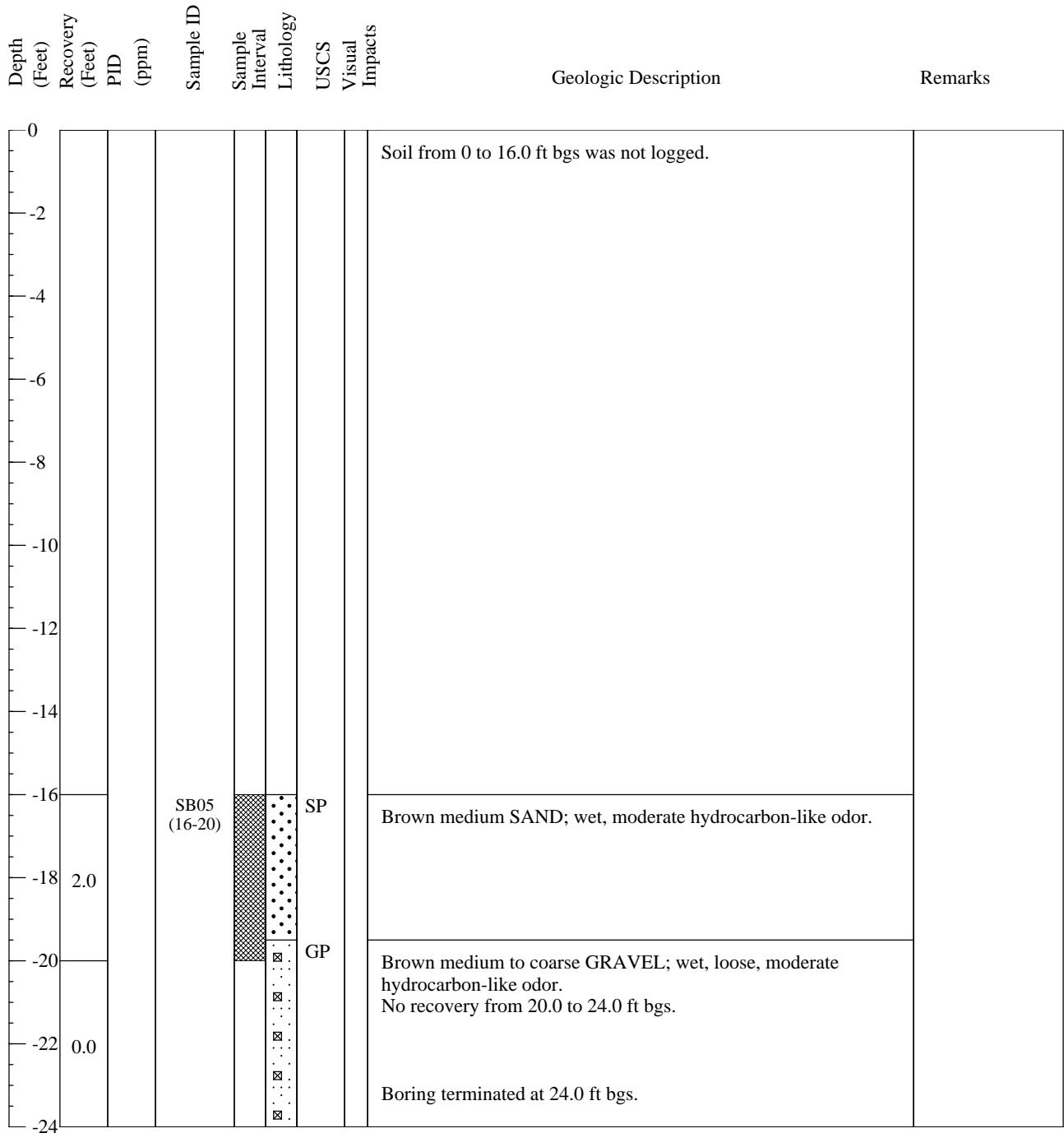
**Drilling Company:** Paragon Environmental Construction, Inc.

**Sampling Method:** Split spoon, macro-core

**Ground Elevation (ft/msl, NAVD 88):** NA

**Total Depth:** 24.0 ft bgs

**Logged By:** H. Jones



Coal Tar or Coal Tar NAPL Saturated Soil



Hydrocarbon Staining, Hydrocarbon Sheen or NAPL Blebs

Comments: Sample SB05(16-20) was sent to XDD.

**Project Name:** Norwich MGP Site

**NYSEG/Project Number:** NYSEG/04964-031

**Date Started/Date Completed:** 8/4/09

**Boring Location:** 15 ft east of well PZ09

**Drilling Company:** Paragon Environmental Construction, Inc.

**Sampling Method:** Split spoon, macro-core

**Ground Elevation (ft/msl, NAVD 88):** NA

**Total Depth:** 22.0 ft bgs

**Logged By:** H. Jones

Depth (Feet)	Recovery (Feet)	PID (ppm)	Sample ID	Sample Interval	Lithology	USCS	Visual Impacts	Geologic Description	Remarks
0								Soil from 0 to 16.0 ft bgs was not logged.	
-16	1.5					GP		Brown coarse to medium GRAVEL, some coarse to medium sand; wet, loose, slight hydrocarbon-like odor.	
-18	1.5					SP GP		Brown medium SAND; wet, some NAPL blebs, moderate hydrocarbon-like sheen, moderate hydrocarbon-like odor.	
-20	0.3							Brown coarse to medium GRAVEL; wet, loose, trace NAPL blebs, slight hydrocarbon-like odor. Brown coarse to medium GRAVEL; wet, loose, trace NAPL blebs.	
-22						CL		Brown CLAY; dry, compact. Boring terminated at 22.0 ft bgs.	



Coal Tar or Coal Tar NAPL Saturated Soil



Hydrocarbon Staining, Hydrocarbon Sheen or NAPL Blebs

Comments: No samples were collected.

## **Appendix M**

### **Remedial Design Approval Letter**

# NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Environmental Remediation, Remedial Bureau C  
625 Broadway, 11th Floor, Albany, NY 12233-7014  
P: (518) 402-9662 | F: (518) 402-9679  
www.dec.ny.gov

July 8, 2016

Mr. Tracy Blacizek  
New York State Electric and Gas  
Corporate Drive – Kirkwood Industrial Park  
PO Box 5224  
Binghamton, New York 13902

Re: Remedial Design Report Off-site Target Area 100% Submittal  
Norwich Former MGP Site  
Norwich, Chenango County, New York  
Site No. 709011

Dear Mr. Blazicek:

The New York State Department of Environmental Conservation and New York State Department of Health (Departments) have reviewed the "Remedial Design Report Off-site Target Area 100% Submittal" for the Norwich Former MPG Site, dated March 18, 2016.

Based on the review, the Department has determined that the report satisfactorily addressed the Department's comments in a letter dated March 3, 2016. The report is hereby approved with the following comment:

Please remove the Citizen Participation Plan from the Remedial Design and submit as a separate document.

Please submit the final copy of the Remedial Design which is signed and stamped by a professional engineer licensed to practice in New York State to this office and appropriate distribution list within thirty (30) days of this letter.

Please contact me at 518-402-9662 if you have any questions.

Sincerely,



Sarah Saucier, P.E.  
Environmental Engineer 1  
Remedial Section C  
Division of Environmental Remediation



Department of  
Environmental  
Conservation

Ec: J. Ruspantini, NYSEG  
S. Underhill, AECOM  
S. McDonough, AECOM  
M. Doroski, DOH  
M. Schuck, DOH  
A. Omorogbe